FLIGHT
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Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

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Sept. 24 .... Newcastle-upon-Tyne Aero Club Flying Meeting.
Sept. 24 .... Merseyside Air Pageant, Hooton Park, Lancs.
Sept. 25 .... Schneider Trophy Race at Venice.
Sept. 30 .... Entries Close for Edward Busk Memorial Prize (R.Ae.S.)
Oct. 1 .... Reunion Supper at "White Horse Hotel," Holborn, of 28 Sqdn. (R.A.F.) Old Boys' Assoc.
Oct. 20 .... Aero Golfing Soc. (Cellon Cup), Walton Heath.
Dec. 31 .... Entries Close for R. 38 Memorial Prize (R.Ae.S.)

1929

Oct. 31 .... Guggenheim Safe-Aircraft Competition Closes

EDITORIAL COMMENT.

STRICTLY speaking, the great contest which is to take place at Venice on Sunday for the Schneider Seaplane Trophy is not a race, inasmuch as the first man to cross the finishing line is not necessarily the winner, the six machines not starting together. Owing to the speeds at which the machines will travel, they will in all probability become somewhat "mixed up," and it is not expected that it will be an easy matter for the thousands of spectators to follow closely what is happening unless the "scoring board" service is exceptionally efficient. That the contest will be a great spectacle for all that, cannot be doubted, and although the greatest secrecy has been maintained concerning the actual speeds of which the various machines are capable, there does not appear to be much doubt that the race will be won at close upon 290 m.p.h. The Venice course is a difficult one in that it includes two very sharp corners, on which the machines will have to turn through very nearly 180 degrees. To avoid losing too much time, this will mean very steeply-banked turns, and here the skill and physical fitness of individual pilots will count for a very great deal. Fortunately, Great Britain is much better prepared this year than has ever been the case before, and the pilots under the command of Air Vice-Marshal Scarlett have had good practice at Felixstowe. Curiously enough, although the speeds of this year's machines are much higher, there has been very little talk of pilots becoming semi-conscious when doing sharp turns. Whether this is due to their training or to the discovery of a method of turning by which the effects of contrifugal force is lessened is difficult to say, but it is interesting to point out that the factor which was at one time thought to mark the limits of what was possible, *i.e.*, the ability of the pilot to stand the stresses, seems to have become one of relatively minor importance.

The Great Race

Technically also Great Britain is vastly better prepared this year. Not only have the designers had time thoroughly to study their problems, but machines have been built in sufficient numbers for practice

flights to be carried out without the thought always in mind that a crash during tests meant the absence of a challenger in the race. This is, of course, due to the Air Ministry's policy of undertaking the task of financing the production of the machines, the cost of which has now reached a magnitude such that it is quite outside the ability of any individual or aircraft firm to afford the expense. Quite apart from whether this country is successful in the race or not, we are quite sure that the expenditure will have been well worth while. The designers—and the technical staff of the Air Ministry—will have gained much valuable information, information which could not have been obtained in any other way, which will directly benefit the production of high-speed single-seater fighters for the Royal Air Force. Much can be discovered from wind tunnel experiments, and the de Havilland Aircraft Company has shown, with their "Tiger Moth," a description of which appears in this issue, that high-speed research *can* be carried out at relatively small cost, but there must always remain a certain number of problems connected with ultra-high speeds, which can only be settled by actual flying experiments. Moreover, there is always the subject of the engines. Whatever can be learned of aerodynamic problems from only moderately high-speed machines, there will always remain the subject of powerful, light and reliable engines, and it would be difficult to imagine anything better calculated to test to the uttermost the qualities of an aero engine than a race like that for the Schneider Trophy.

Figures relating to the Napier racing engines are not available for publication, but it is no secret that the new engine develops a great deal more power than did the model fitted in the Supermarine and Gloster machines in 1925, while it is much "cleaner" for fitting into the machines. It is believed that the reliability is all that could be expected from the power-weight ratio obtained, while the gearing should result in a very considerable gain in propeller efficiency. So that altogether Great Britain may be regarded as being in a better position to win the race than she has been for several years; in fact ever since Capt. Biard brought the Schneider Trophy to England on his Supermarine flying boat with Napier "Lion" engine.

That the Italians have not been idle either is a foregone conclusion. The Macchi company accomplished the incredible last year by increasing, in one bound so to speak, the speed of their machine from something like 160 m.p.h. to 246·5 m.p.h. around the Schneider course. A firm which was capable of doing that is not likely to have sat down and twiddled its thumbs, and from such scant information as has reached this country it would appear that the 1927 Macchi racer, type M.52, is a considerable improvement on last year's machine.

It seems likely, however, that by far the greatest improvement will be found to have been effected in the Fiat engine, this year's model of which is rumoured to develop rather more than 1,000 h.p., with no increase in weight or frontal area. Should that be the case, it is obvious that the Italian defenders will be in a position to put up a formidable fight, and whoever wins the race will evidently be very hard put to it to do so.

A great deal will depend, apart from the qualities of engines, machines and pilots, on the organisation of the actual race, and in this respect it is known that Great Britain has gone into detail to an extent never hitherto attempted. For instance, some of the British engines are geared, while others are ungeared, and it is said that the machines fitted with the geared engines are slightly faster, owing, presumably, to better propeller efficiency, or possibly to the geared engines being run at higher speeds, developing more power, but giving about the same propeller efficiency. On the other hand, the reduction gear introduces a certain small amount of complication, and it is conceivable that the tactics of the British team will be to put two geared engine machines and one ungeared in the race, on the assumption that if all goes well with the geared engines, these two machines will have the requisite speed, while the direct drive machine will be flown throttled down to some extent and will thus be able to open out during the race, should one or both of the faster machines meet with misfortune.

It will be seen that team work will count for a very great deal, and it speaks well for the thorough sportsmanship of the British service pilots that they are one and all willing to subordinate personal interests and inclinations to considerations of the success of the team. In other words, the spirit in which the British pilots are tackling the race is that so long as a British machine wins the race, it is immaterial which pilot proves the victor, and in that spirit lies a tremendous strength.

The result of the race for the Schneider Trophy cannot possibly be foretold. Personally we are optimistic of a British success, but we hope the race will be a hard one, and "may the best man win."

Home Defence Observer Corps

A SERIES of exercises commenced on September 19 by the Observer Corps as part of the Home Defence Scheme, in conjunction with four squadrons of fighters and three squadrons of bombers. These exercises, which conclude on September 23, will be the culminating point of the year's training for the ground observers. The Observers' Corps was established in 1924, starting on a small scale, and is organised on an entirely voluntary basis. The observers, who are sometimes described as special constables, are enrolled in the counties and boroughs to which the scheme applies. The corps has been gradually expanded and now, so far as personnel and general organisation are concerned, is complete in the counties of Essex, Sussex, Hampshire and Kent. Each group is organised into a network of observation posts to report the movements of enemy aircraft over their respective sectors. The organisation is also being developed in other counties. The work of these volunteers is regarded by the authorities as vital to the Home Defence Scheme. The duties of the volunteers calls for continual and unpaid service when the exigencies of the service require it. During the recent Air Exercises, when London was submitted to a series of sham air attacks for five days, the work of the observers was highly praised by the authorities of Air Defences of Great Britain. In the present exercises the groups took part by rotation for the first four days, but on Friday there will be a grand *finale* with all groups on duty, and all the seven air squadrons engaged. The work of the observers will be strenuous during tomorrow's operations and we trust that the weather will not make it too unpleasant.

German Officers and Aircraft Banned

THE use of a large Junkers' passenger machine for making passenger and propaganda flights between Mainz and Wiesbaden over occupied territory has been forbidden by the inter-Allied Rhineland High Commission. Some German officers who wished to attend the meeting of the Aeronautical Scientific Society at Wiesbaden, commencing September 16, have also been forbidden entrance to occupied territory. Prof. Junkers intended to fly by seaplane to Mainz, but was refused permission.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

THE SCHNEIDER TROPHY RACE

Venice, September 11, 1927.—The preparations in all directions for the Schneider Trophy Seaplane contest on September 25, have now reached what may be regarded as the "hectic" stage, and the various committees, the teams, and, in fact, all connected with the event are having a very busy time.

The English team, and, in fact, the whole British "camp," are now established at the Lido Excelsior Palace, and at San Andrea, the Venetian Air Port, where the hangars are situated.

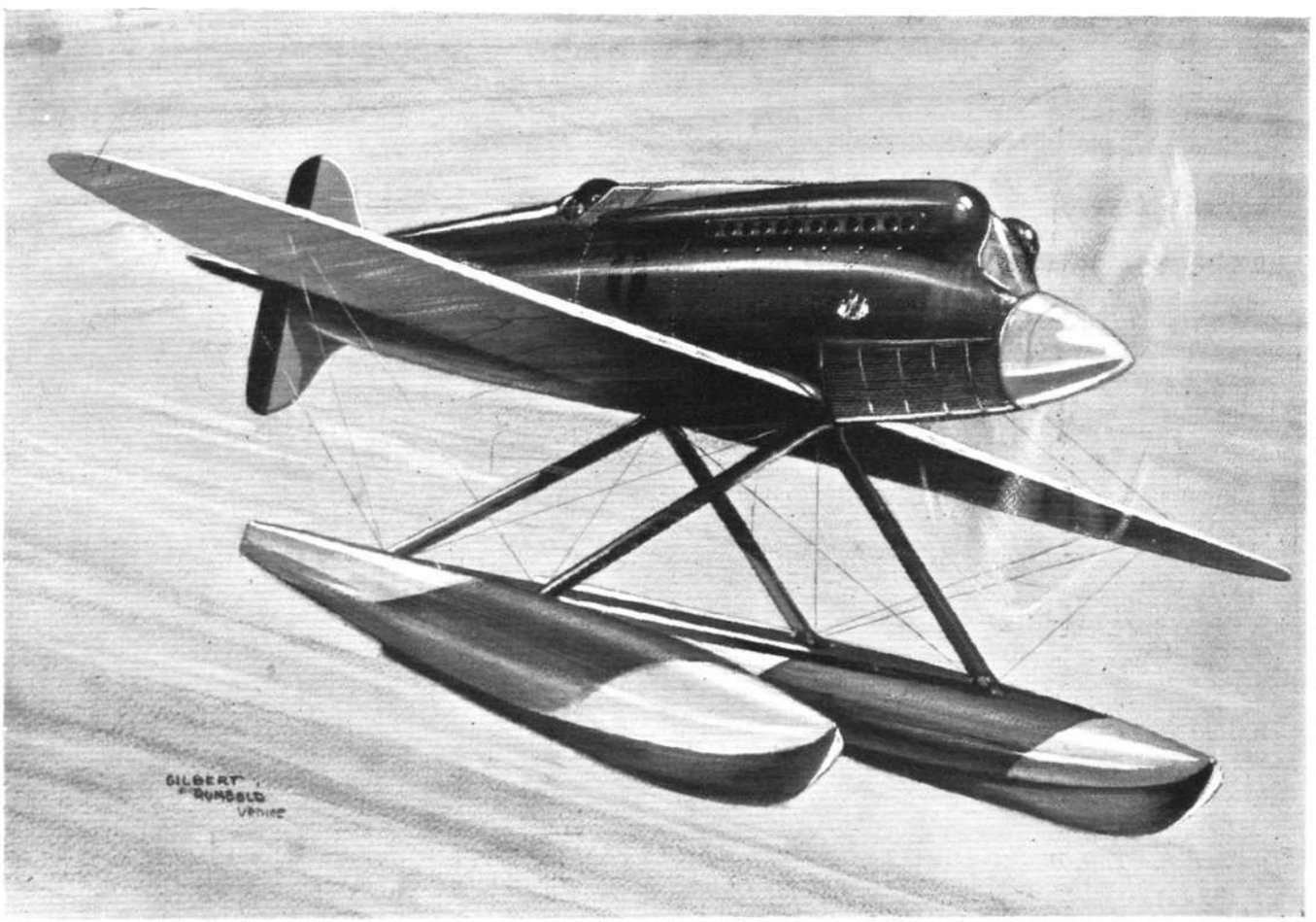
Squadron-Ldr. L. H. Slatter and Flight-Lt. O. E. Worsley were the first to arrive, and reached Venice on August 30, the day before the first consignment of machines reached San Andrea on S.S. *Eworth*. The consignment consisted of three seaplanes, the Gloster-Napier 4A, the Supermarine-Napier N222, and the Short-Bristol "Crusader," in large wooden crates, and the work of unloading was proceeded with in a very efficient manner, and without hitch. It should be stated that this was due, in a large degree, to the extremely courteous and thoughtful manner in which the Italian authorities received the English contingent. Every possible care had been taken to ensure that they received the utmost facilities in their work, and lighters were at hand as soon as the *Eworth* docked. The hangars provided for the English machines are ideal in every respect, and Sq.-Ldr. Slatter has expressed his complete satisfaction of all the arrangements that had been made.

It was hoped, of course, to be able to commence practice over the course within a few days of arrival, but unfortunately a spell of somewhat squally weather appeared, with a resultant choppy sea, and the pilots were obliged to wait patiently for a full week before being able to take the racing machines into the air.

Meantime, the rest of the team arrived, consisting of Flight-Lieuts. S. M. Kinkead, S. N. Webster, O. E. Worsley, F./O. H. M. Schofield, all of whom are staying at the "Excelsior Palace."

Yesterday, the 10th inst., the first practice flights took place over the actual course, the weather being ideal, and a good morning's work was therefore put in. At 9.30 a.m. the Supermarine-Napier "S5" N222, was towed from the hangar slipways by motor-launch out into the wide entrance to the port of San Andrea, being followed shortly afterward by the Gloster-Napier IV. 4A.

As soon as a satisfactory "take-off" had been reached, Sq.-Ldr. Slatter climbed into the cockpit of the "S5," and the engine was started. Then, without any preliminary "warm-up," he turned the machine towards the open sea, and opened the throttle for flight. The tremendous power behind the Napier engine was immediately apparent, and the acceleration of the machine was truly wonderful. Another noteworthy point was the absence of excessive spray, a point which, by the way, also applies to the Gloster-Napier biplane. The design of the hydroplane floats shows a big advance, and evidences the enormous amount of research work in this direction, which the designers have carried out.



AVANTI SAVOIA! An impression of Italy's Schneider Trophy defender, the Machine M-52 monoplane, which in general appearance is similar to the M-39, last year's winner.

Sq.-Ldr. Slatter took the S5 over the full course, after executing a series of turns over San Andrea, but it was apparent that she was not exhibiting her full turn of speed.

The Gloster-Napier IV 4A took the air shortly after S5 N222, piloted by Flight-Lieut. S. M. Kinkhead, and appeared decidedly faster, both during the take-off and in flight. He headed the machine straight for the Lido, and gave the bathers along its famous beaches quite a definite idea of the capabilities of the modern racing seaplane.

It is not yet decided which will be the three pilots to fly in the actual race, and it is understood that this matter is one for the decision of the committee of the Royal Aero Club. It is not even known which of the six British machines will compete, and each type will not necessarily be represented in

the final choice. It is assumed, of course, that the actual performances during practice will be the deciding factor.

There are several interesting details in connection with the contest, which have now been definitely decided by the governing committee. The preliminary tests which form an important part of the programme, are to take place on September 23 and 24, and are to be arranged as follows :—

At certain points in the Canale Tre Porti, which is of course part of the Venetian lagoon, two buoys are to be moored at a distance apart of half a mile (nautical). For the first test, the machines are required to approach and pass the first buoy afloat, and must take off before reaching the second buoy. They must then make a short circuit in the air, of about seven miles, returning to the first mark, and alighting before reaching it. The distance between the two buoys must then be covered afloat without taking off. After these tests, it is necessary for all entrants to remain moored in the open for six hours, a test designed to prove the seaworthiness of the seaplane floats.

The "Tribune," as the Italians designate the judge's box, timing stand, etc., is to be erected on the private beach of the "Excelsior" Hotel, and arrangements are also being made for a huge indicator board to be erected on the north side of the same beach. It is hoped, by this means, and also by the use of loud speakers all along the Lido water-front, to keep all officials, and the general public, speedily and accurately informed as to the progress of the actual race, lap by lap. In fact, the organisation that is being built up for the convenience of the general public appears to be very complete.

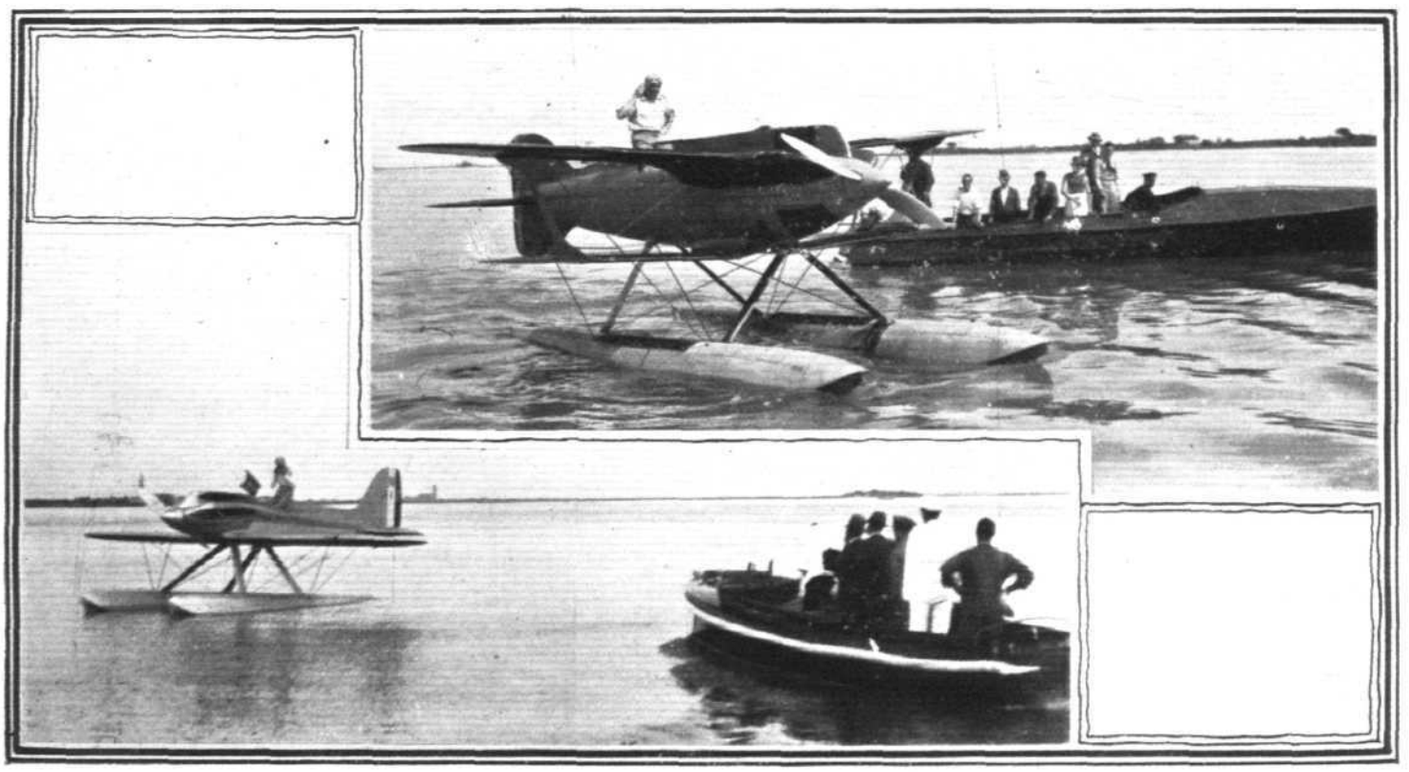
Sqdr.-Leader Slatter, in an interview, intimated that he would like to express his appreciation of the truly "sporting" manner in which the Italians have received our team. Both he and the other members of the contingent were saved a great deal of "spade work" on account of the fact that the smallest detail of their requirements had been attended to prior to their arrival, and the Italians have placed every convenience at their disposal in order to ensure the utmost efficiency in preparing both team and machines for the great race. Sqdr.-Leader Slatter stated further that all the British pilots are looking forward to the struggle with a confidence built upon their conviction that their machines are faster than anything yet seen in public, and that the Italians will have had to make very big strides in design in order to prove themselves worthy competitors. The British team are awaiting with eager interest a glimpse of the machines of their much-discussed rivals, when they appear in Venice, as is expected, on or about September 20.

Venice, September 17, 1927.—It is a significant fact that to-day one listens in vain for the song of the "Napier" Lions that had become such a familiar sound during the first days of the week. For the past three days, the weather clerk has been extremely unkind in providing us with choppy seas and winds that are altogether undesirable for a "take off" from the San Andrea Canal, where the hangars are situated.

Nevertheless, although one has not seen as much flying as one would perhaps wish, the week has been one full of activity, and has provided plenty of work for all concerned.

There was, of course, no further flying on Sunday, following the most unfortunate mishap to the Short-Bristol "Crusader," and it was only natural that gloomy faces predominated among the British contingent throughout the day. So far, no fresh light has been thrown upon this incident, and although it is hoped that salvage operations will recover the wreckage, the engine and fuselage have not yet been brought to the surface. There is no doubt that Flight-Lieut. Schofield had a perfectly miraculous escape, and it will be received as very good news that his recovery is now almost complete. His injuries were surprisingly slight, the most serious being a bad cut and bruise over the right eye, probably caused as he was flung clear from the machine. When picked up, he was quite conscious, though dazed, and he actually swam to the floating tail portion, and was clinging to it when picked up by the motor boat. He had actually removed his shoes and nether garments!

On Monday there was a great deal of activity, both in Venice and at Lido. Both the supermarine-Napier S.5 (N222) and the Gloster-Napier IV. (4a) were early in the air, and gave a wonderful display of speed and cornering under the pilotage of Flight-Lieut. Webster and Flight-Lieut. Kinkead respectively. The latter has been "flipping" the Gloster-Napier consistently throughout the practice spins here, and Flight-Lieut. Webster has been putting in a deal of useful work on the Supermarine-Napier monoplane. Unfortunately, Sqdn.-Leader Slatter had contracted a chill, and was compelled to "lay off" for a spell in his room at the "Excelsior." Monday was a noteworthy day on account of the much-looked-for arrival of the H.M.S. *Eagle*, the aircraft carrier which was transporting the remaining machines from England. She came to anchor at a point off the entrance to Porto di Lido, so as to facilitate the unloading and lightering of the machines to the San Andrea base, and the necessary work commenced very shortly after her arrival. H.M.S. *Eagle* was accompanied by four destroyers—*Wild Swan*, *Wren*, *Worcester* and *Whitehall*—and these proceeded on to Venice, where they were moored for a few days in the Lagoon.



PREPARING FOR "THE DAY": Two of the British Schneider Trophy Challengers make trial flights at Venice. Top, Flight-Lieut. Kinkead, on the Gloster-Napier IV, and (below), Sqdn.-Leader Slatter, on the Supermarine-Napier S-5, after the first practice flights on September 10.

off the Piattzetta. It is understood that these destroyers will patrol the course during the progress of the actual race. Aboard the H.M.S. *Eagle* were, of course, the two other Supermarine-Napier S.5s, and one Gloster-Napier IV. On the day of arrival the two former were taken off, a very good day's work, and the work of assembly was commenced the day following. The Supermarine-Napier was landed safely at San Andrea on Tuesday, and the small army of mechanics, as can be imagined, were extremely busy from then on.

Tuesday, unfortunately, produced an adverse wind, and it was decided, finally, after an all-day wait for conditions to improve, that it was not advisable to take the machines up. The weather, however, broke fine and clear on Wednesday morning, and both machines were taken over the course. It is, as has already been stated, impossible to give details of their actual performance, but it may be said that there will merely be brought to a spot nearer the shore line, and the whole triangle will therefore be swung round a little towards the north-west. The only object of this, as far as one can gather, is to make the event somewhat more spectacular for the onlookers who will be gathered in great numbers all along the Lido beaches. The machines will now pass the *Tribune* at the " Excelsior " quite close in-shore when making for the turn at Porto di Malamocco, and certainly should provide the crowd with all the thrill they desire !

On Thursday, the H.M.S. *Eagle* left for Brione, where she is basing *pro tem.*, and the four destroyers accompanied. It is expected that they will return some time during the coming week. Meantime the lack of flying since, owing to the adverse weather, has been offset by a concentration on the work of assembling the remaining machines, and it is hoped to see them all in the air sometime over the week-end. The Supermarine-Napier S.5, is already complete, and would

ITEMS FROM THE LIDO : Top, left : Gen. Andreani, the head director of Italian organisation for the Schneider Trophy Contest. Right, Messrs. E. Scott, R. V. Mitchell, Major Buchanan and Sqdn.-Leader Slatter enjoy the Italian sun. Below, an attending motor-boat during the practice flights at San Andrea, in which may be recognised Mr. Mitchell, Major Buchanan, Captain Conte di Robilant, and Flight-Lieut. Webster.

appears to be very little to choose between the two. They both exhibit a remarkable quality of " flyability," and they appear to be easy on control, particularly on the turns. This latter is, of course, a very important point, as the turns on the course are in the two cases extremely acute, and there is no doubt that a really fast turning machine will possess a tremendous advantage in the actual race.

Whilst touching upon the subject of the course itself, it should be mentioned that there has been a great deal of discussion during the past week as to the advisability of altering the previously arranged course slightly, so as to bring the machines considerably nearer shore on the leg that stretches between the pylon on the mole of Porto di Lido, and the pylon at Malamocco. In spite of objections from many quarters, it is interesting to learn that it has practically been decided to carry out this alteration. It should be pointed out that this decision does not in effect actually alter the course as such. The point of the triangle at Porto di Lido have been ready to take her first Lido flight yesterday (Friday) had conditions permitted.

The strictest guard is being maintained over all the 'planes, and a service man sleeps beneath the fuselage of each machine throughout the night.

There is no doubt that as soon as the expected spell of fine weather arrives, there will be some superb exhibitions of flying, over the Lido water, as the delays of various kinds that have held arrangements up so much, leave now a bare seven days for the necessary practice before the race. This must of necessity now take a somewhat concentrated form, and the British contingent are ready for an extremely busy time during the coming week.

The Italians still preserve the air of absolute secrecy that has shrouded their activities throughout the whole of the preparations for the contest, and although the team of Italian pilots have been resident in Venice, at the Danielli, for the past few days, there is still no sight of the actual machines.

A number of cases, presumably containing parts, arrived at San Andrea yesterday (Friday) and it is assumed that their assembly work will be carried on behind the official veil.

It is known, however, that the Macchi-Fiats M 52, are exactly similar in most respects to the victorious M. 39 of last year's contest, and even the inter-float connecting struts are still retained. The Fiat engine fitted to all four machines is of the familiar V-type, having twelve water-cooled cylinders arranged in two banks of six. The plugs are apparently fitted external to the fuselage, and their heads protrude through holes in the engine cowling. This cowling rises from a large, pointed propeller boss, at a somewhat acute angle, and the fairing of the cylinder head cowlings is carried out by means of spherical nosed protuberances which taper from front to rear, and finally merge into the lines of the fuselage. A further slight "fairing" runs the whole length of the top of the fuselage except for the break to accommodate the pilot's head. The general appearance of the fuselage, although giving the appearance of some bulk, is nevertheless a beautiful example of streamlining of the "cigar" type. It tapers away to a point at the rudder hinge. Details of bracing etc., are exactly similar to type M. 39. A neat radiator is fitted underneath the forward portion of the fuselage, presumably for oil.

The floats show a slight alteration in design, and are undoubtedly the result of intensive experimental work during the past year.

Whether the actual horse-power has been added to anything approaching the figures which Dame Rumour so generously circulates, remains to be seen, but one must naturally look for an improvement in this respect at least.

A great deal of interest has been arounsed in Venice, by the fact that the really beautiful Schneider Trophy has been placed on public exhibition outside the Musee Civico in St. Mark's Square, and a crowd is daily swarmed around it in an endeavour to catch a glimpse of the coveted prize. The many people who have already arrived in Venice to witness the contest proclaim the enormous public interest which this year's race has aroused, and a vast number of posters, etc., have been distributed throughout Italy with the object of still further stimulating this enthusiasm.

The arrangements with regard to the "tribune," timing boxes, etc., are now complete, and they have been carried out in a manner that bespeaks the efficiency with which the whole of the work is being put through.

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U.S. AIR MAIL FIGURES

SOME very interesting figures, showing the tremendous success of the operation of eleven contract air mail routes throughout the U.S.A. during the months of May, June and July this year, are published in our American Contemporary *Aviation*. We quote these herewith as they form a striking comparison to the figures obtaining on this side of the Atlantic.

It will be seen that for the month of May there were 46,133 lb. of mail carried on these routes, 55,026 lb. in June, and 53,521 lb. in July. While the amount of mail carried was less for July than for June, there were but 25 business days in July as against 26 in June, which accounts for the apparent falling off in postal business.

There was an increase of 16·3 per cent. in the business of the contract air mail routes for the month of July over that for the month of May, while the month of June showed an increase of 19·3 per cent. in business on these routes over that of May.

Six of the twelve contract air mail routes operating in the United States, Nos. 3, 5, 6, 8, 9 and 12 performed 100 per cent. service during July. Figures published by Second Assistant Postmaster General Glover showed that the total postal matter handled by seven air mail routes operating from Le Bourget, Paris, for the month of March, 1927, amounted to less than 800 lb., and 1,282·6 lb. in April. For the month of July there were ten routes in the United States that handled over 1,000 lb. of mail matter, and nine routes in June.

U.S. CONTRACT AIR MAIL ROUTES IN OPERATION DURING MAY, JUNE AND JULY, 1927.

	May			June			July		
Route, Termini and Contractor	Pounds carried	Miles flown	Pay of contractor $	Pounds carried	Miles flown	Pay of contractor $	Pounds carried	Miles flown	Pay of contractor $
CAM-1, Boston, Mass.—New York. Colonial Air Transport ..	1,590	7,208	4,770·19	2,603	9,588	7,809·37	2,222	9,526	6,667·50
CAM-2, Chicago, Ill.—St. Louis, Mo. Robertson Aircraft ..	2,363	11,484	5,980·24	3,856	12,232	9,760·03	2,940	11,206	7,441·87
CAM-3, Chicago, Ill.—Dallas, Tex. National Aircraft Transport	9,460	60,846	28,381·12	10,542	58,967	31,626·37	9,499	61,194	28,497·94
CAM-4, Salt Lake City, U.—Los Angeles, Cal. Western Air Express	15,213	36,965	45,639·00	17,120	35,530	51,360·56	17,390	36,965	52,171·12
CAM-5, Elko-Nev.—Pasco, Wash. Walter T. Varney	4,304	28,213	12,912·94	5,392	31,625	16,176·94	5,503	32,860	16,508·62
CAM-6, Detroit, Mich.—Cleveland, O. Ford Motor Co.	172	4,550	186·16	235	4,550	254·27	128	4,550	138·21
CAM-7, Detroit, Mich.—Chicago, Ill. Ford Motor Co.	913	11,376	985·57	982	11,850	1,060·76	1,063	11,376	1,148·17
CAM-8, Seattle, Wash.—Los Angeles, Cal. Pacific Air Transport	5,325	52,892	15,042·53	6,131	56,942	17,342·88	6,708	59,346	19,033·82
CAM-9, Chicago, Ill.—Minneapolis, Minn. Northwest Airways ..	2,157	15,834	5,931·23	2,730	16,074	7,506·98	2,505	15,456	6,887·89
CAM-11, Cleveland, O.—Pittsburg, Pa. Clifford Ball	1,763	7,005	5,289·37	1,992	7,194	5,975·06	2,026	7,134	6,078·84
CAM-12, Cheyenne, Wyo.—Pueblo, Col. Colorado Airways ..	2,873	11,736	8,619·75	3,443	11,639	10,328·62	3,537	12,338	10,609·87
Totals	46,133	248,109	133,738·10	55,026	256,191	159,201·84	53,521	261,951	155,183·95

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Atlantic Wins Again

CAPT. R. H. MCINTOSH and Commandant Fitzmaurice left Baldonnel Aerodrome, near Dublin, on September 16, at 1.36 p.m., in an attempt to reach New York via Newfoundland in their Fokker monoplane, "Princess Xenia." About six hours later they were forced to descend at Beale Strand, Ballybunion, County Kerry, defeated by strong head winds, rain, and bad visibility over the ocean. Repeated efforts to forge through had been in vain. At times the Fokker was no more than 50 ft. above the sea during the two hours or more that were spent in struggling to get clear. It had been reported at different parts of the coast of Ireland some time after its start from Dublin, and finally it landed safely on the mouth of the Shannon at 7.30 p.m. The petrol capacity of the Fokker was equal to 41 hours' flying, although it was naturally expected that the flight to New York would take much less time than this. No wireless was on board, but a small boat with oars was carried. The return flight to Baldonnel was made on September 18. Before a decision on future plans is made the machine will be thoroughly examined. Captain McIntosh is bound by no fast contract over this Atlantic attempt, for his principal backer, Mr. William Leeds, released him from all obligations following the recent public agitation against such ocean crossings.

A Royal Airman

PRINCE GEORGE flew to Paris from London on September 15 in an Imperial Airways Silver Wing-de-Luxe air liner, leaving at 4.30 p.m. and arriving at 7.33 p.m. A strong head wind prevailed during the flight. Last June Prince George flew across from Paris to London in a Handley Page air liner.

R.A.F. Flying Boat Tour

FIVE Supermarine "Southamptons" of No. 480 Coastal Reconnaissance Flight, R.A.F., are making a tour of 37 coastal towns in Great Britain. They have already flown westwards round the coast to Scotland, crossing over the land to the east coast, and then coming south, calling on their way at Scarborough, Skegness, and Hunstanton. On September 17 they were at Yarmouth and Cromer. At the latter town the Air Minister, Sir Samuel Hoare, and the Lord Mayor of Norwich went for a flight up the Norfolk coast. Two flying boats visited Cromer, whilst two others called at Yarmouth, where one of them was moored off the jetty. The Mayor and acting Town Clerk went on board and were received by Flight-Lieut. Fletcher and Flying Officer Young, who afterwards took luncheon with the Mayor on shore. The machines were meanwhile open to public inspection.

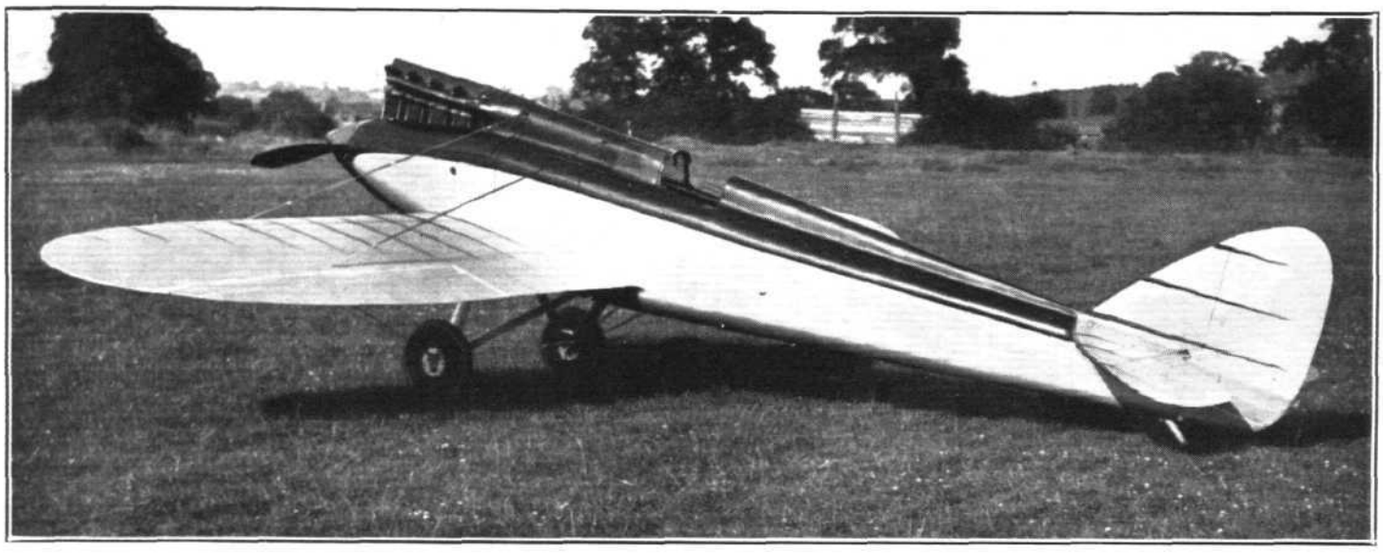
"Miss Columbia" Refuses

CAPTAIN HINCHLIFFE and Mr. Levine tried to get "Miss Columbia" away from Cranwell Aerodrome, Lincolnshire, on September 17, for some far destination in the East, but she refused. The ground was sodden and the wind changed, and these did not suit her tastes, so she kept her tail down and nose up.

THE DE HAVILLAND "TIGER MOTH"

130 H.P. De Havilland Engine

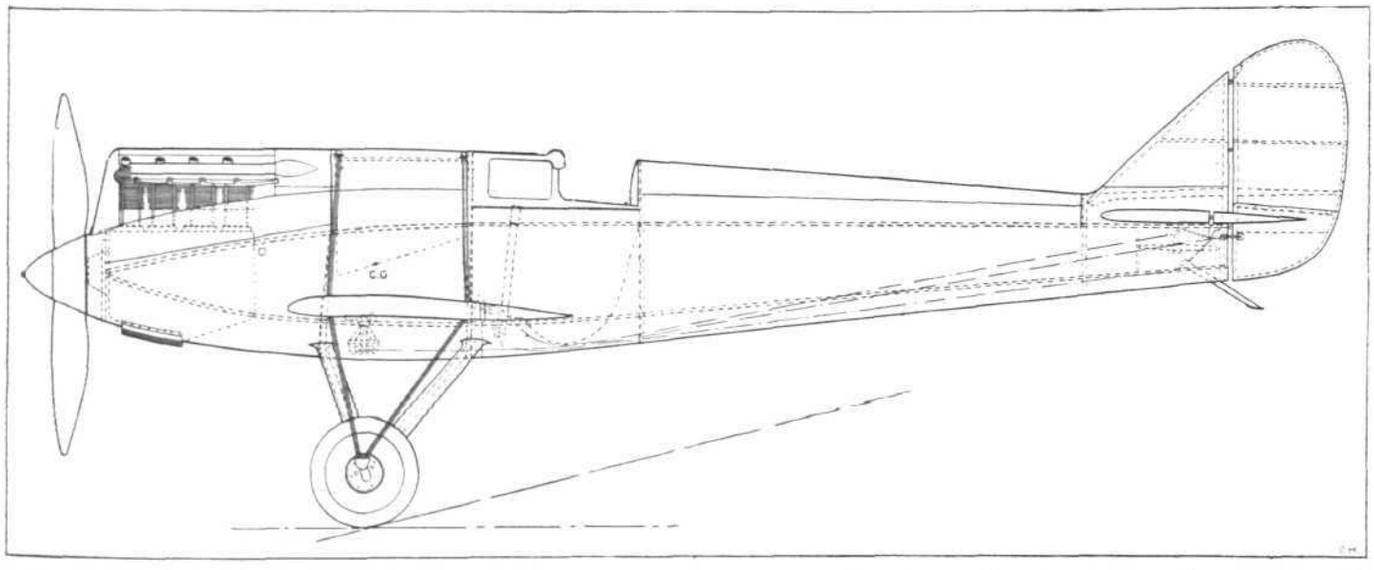
WITH two such outstanding performances to its credit as a speed of 186·5 m.p.h. and an altitude (which does not by any means represent the ceiling) of 20,000 ft., more than usual interest attaches to the little "Tiger Moth" monoplane produced by the de Havilland Company just before the race for the King's Cup. The machine has previously been illustrated in FLIGHT, photographs of it on the ground and in flight having been published from time to time. It is thought, however, that the general arrangement drawings, detail sketches, and notes dealing with various technical points may assist those who desire a more than superficial knowledge of a machine which represents a distinct advance over anything of the same power which has been produced in modern times. As we said when first referring, in FLIGHT, to the new "Tiger Moth," the machine is a racer pure and simple. By no means is it intended for the man who has just learnt to fly. It is decidedly a machine for the experienced pilot. But it is something more than that. Those who are at all familiar with the history of the Schneider Trophy seaplane race of the last few years will know that, apart from technical difficulties, the cost involved in producing machines of this type is exceedingly great. In fact, so great has the expense become that it is quite beyond the capacity of any individual, or even of any aircraft firm, to carry out the work without the financial assistance of the government. As a result, the great race which is to be flown at Venice on Sunday, September 25, will really represent a race between nations and not between firms or individuals. In the "Tiger Moth" however, the de Havilland Aircraft Company sees a possibility of carrying out high-speed research at a reasonable cost, and it is for that reason that the machine is entitled to rather closer scrutiny than if it were merely a freak machine built to win races. It is, we think, essential that these considerations should be kept in mind in examining the design and construction of the "Tiger Moth."



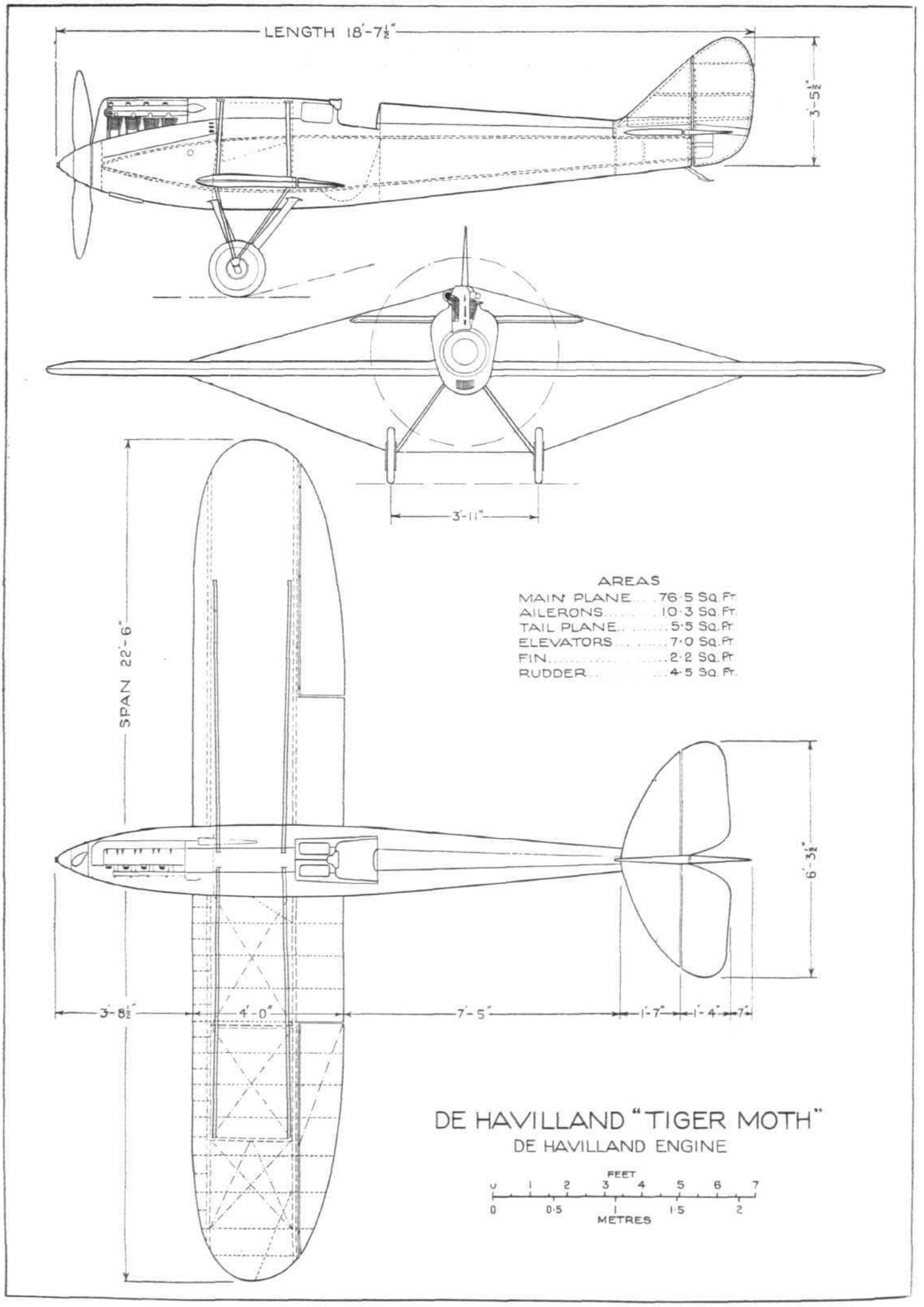
["FLIGHT" *Photograph*

THE DE HAVILLAND "TIGER MOTH": Three-quarter rear view.

Curiously enough, in the general arrangement of the "Tiger Moth" there is considerable similarity to the Supermarine S.5 and Macchi M.52 Schneider Trophy racers. The low wing monoplane position, the reduction of strut bracing to the absolute minimum by having all members tension members except the undercarriage struts, the location of the whole depending upon the attachment of the anti-lift

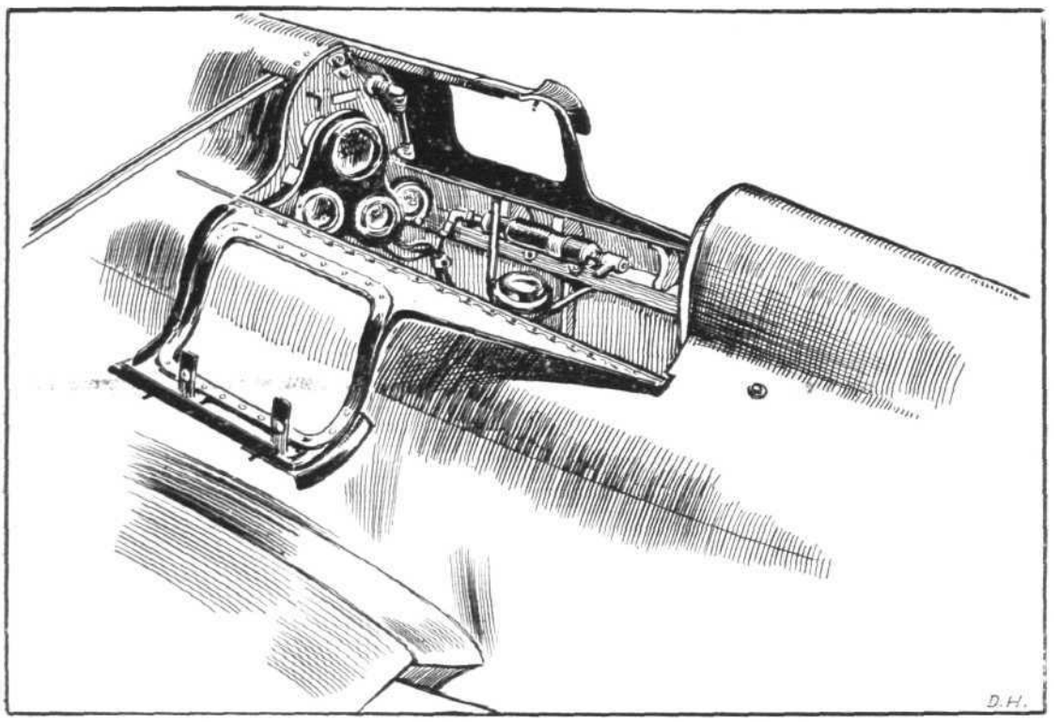


THE DE HAVILLAND "TIGER MOTH": Side Elevation of Fuselage, showing a certain amount of constructional detail.

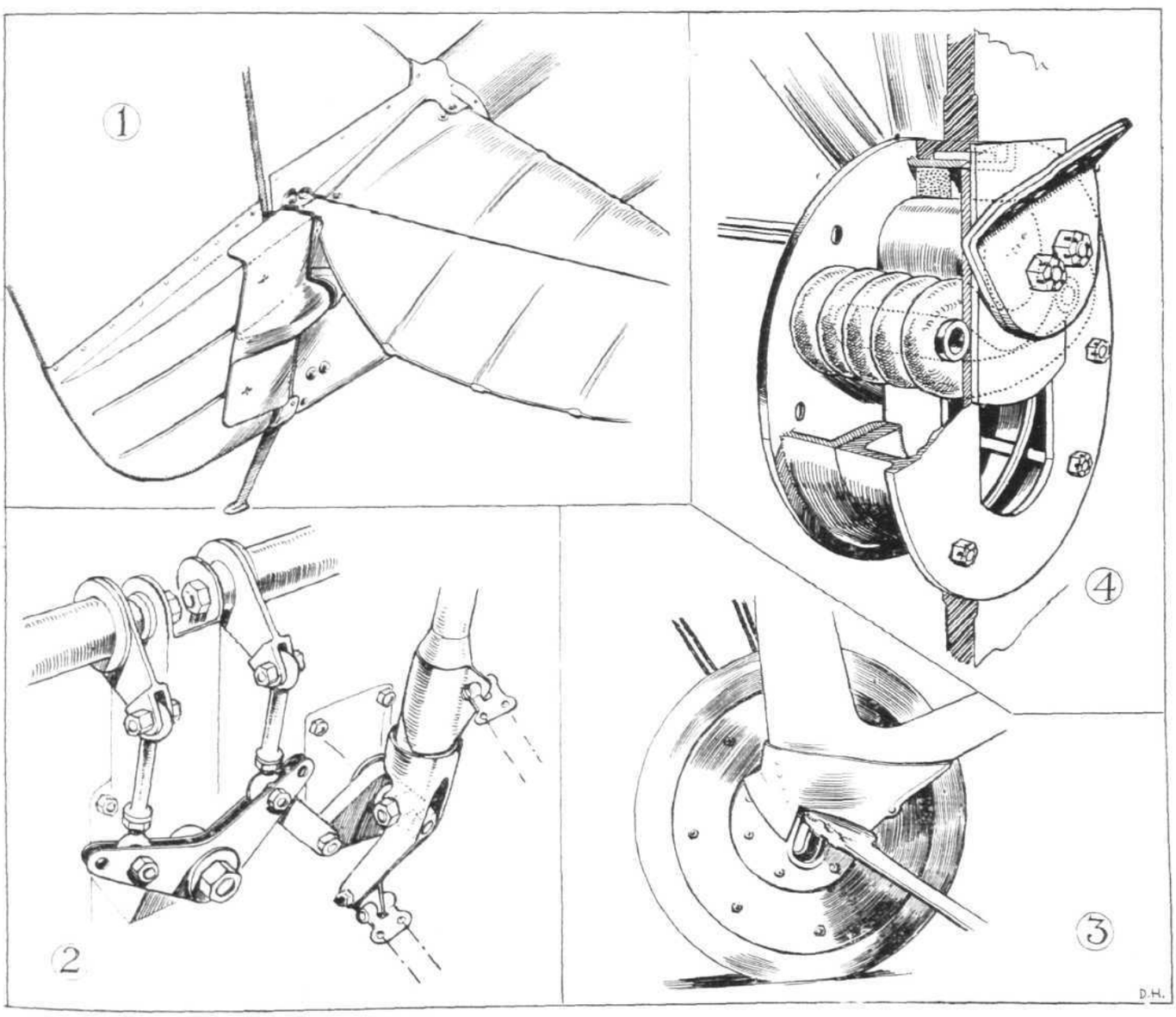


THE DE HAVILLAND "TIGER MOTH": General Arrangement Drawings, to Scale.

wires to the top of the fuselage, and so on ; all are features which the " Tiger Moth " has in common with the Schneider machines. It is even conceivable that the machine could be turned into a seaplane, although with its short length it would presumably require an absolutely smooth sea. In this connection it is not without interest to recall that the Schneider



The De Havilland "Tiger Moth." Top, sketch showing hinged coaming of cockpit. Below, 1 shows how the rudder is thickened to carry out the lines of the fuselage, the gap and cranks being enclosed in hinged casings. The controls are of somewhat unusual type, as shown in 2. 3 illustrates the sprung wheel, enclosing the shock absorbers, some of the details of the mechanism being shown in 4.



The De Havilland "Tiger Moth": View of the Undercarriage. Note the absence of an axle, and the housing of the shock absorbers inside the wheels.

["FLIGHT" *Photograph*

Trophy Race was won at Cowes in 1923 by an American Curtiss racer at the average speed of 177·38 m.p.h. That machine had a Curtiss engine developing close upon 500 h.p. It is not suggested that the "Tiger Moth" as a seaplane would equal that performance, although it might come very close to doing so, but perhaps this illustration may at least serve to bring home the merits of having attained more than 186 m.p.h. with an engine of only 130 h.p.

Constructionally the de Havilland "Tiger Moth" follows normal de Havilland practice fairly closely, *i.e.*, the fuselage is a plywood-covered structure, generally speaking very similar to the fuselage of the standard club "Moth." The cross-section is, however, different in that the sides have a pronounced outward slope towards the top longerons, while the rounded deck of the normal machine has given place to a narrow fairing extending right back to the tail. Roughly, the cross-section conforms to the shape of a man seated with his legs stretched out, the greatest width occurring where the shoulders are, and the top fairing being in line with the head. The usual flat bottom of the standard "Moth" fuselage has been supplanted by a rounded belly, and the work of getting the rounded covering of top and bottom to merge smoothly into the flat sloping sides has been extremely neatly carried out, the joints being quite invisible.

Substantial transverse bulkheads or formers occur where the wing spars are attached, and the fuselage terminates in front in a fire-proof bulkhead. The de Havilland engine, designed by Major Halford, continues the deck fairing in a forward direction, being a 4-cylinder, in-line, air-cooled engine. The engine accessories are very neatly placed, so that there are no excrescences on the sides of the engine. Consequently, the engine cowling is very neat, and the whole engine installation offers a minimum of resistance. The crankcase is ribbed at the bottom, the ribs projecting through the bottom of the fuselage, thus providing cooling of the oil without offering any appreciable extra resistance.

The air intake is on the right-hand side, and the tube crosses over to the left where it bends forward and joins the inlet ports. Immediately above the induction pipe are the exhaust ports with their short stubs. The overhead valve gear is enclosed in a cowling, as is also the starboard side of the engine, but the port sides of the cylinders are left uncovered. The petrol tank is mounted in the deck fairing in front of the pilot.

The cockpit is necessarily small, but although the machine was designed specially for Captain Broad, a pilot of larger dimensions can be accommodated without undue cramping. The fairing in front of the pilot is provided with celluloid windows, and is made in two halves joined by quick-release catches on the centre line and hinged on the top longerons. Thus, when the pilot is in his seat, the two halves of the cockpit coaming are closed, and only the pilot's head projects. The view is quite good, taking into consideration that the pilot is almost enclosed, since by leaning his head slightly to one side or the other he can look forward past the engine.

Owing to the small space available in the cockpit, the controls are somewhat unusual. The stick is universally mounted as usual, but the lateral control is somewhat less direct than normal, owing to the fact that the crank on the stick operates a T-shaped piece, which in turn actuates the ailerons via push and pull rods and torque tubes. The principle is illustrated by a sketch.

Concerning the monoplane wings of the "Tiger Moth" little need be said, as they are of normal construction, with I-section spruce spars and normal wood ribs. The wing is built in two halves, the spars forming a butt joint on the centre line, where they are secured with steel plates and bolts, the spar roots, of course, passing through holes in the sides of the fuselage. The wing bracing is by streamline wires in duplicate. The ailerons, as already mentioned, are operated by torque tubes and cranks. A very neat arrangement has been adopted for closing the gap between main rear spar and aileron leading edge. This space is filled with a strip of sponge rubber, and incidentally the use of this material allows of a certain amount of damping, since working the aileron necessitates compressing the rubber at one edge or other. Thus, by choosing an appropriate thickness of rubber strip, any desired "stiffness" in the lateral control can be obtained. A machine like the "Tiger Moth" is naturally very sensitive on the controls, and so the amount of damping employed is fairly considerable. A similar form of damping and gap-closing is employed between elevator and tail plane.

The undercarriage is chiefly remarkable for the fact that the shock-absorbing gear is enclosed in the wheels, there being no axle. The central discs of the wheels are attached to the apices of the undercarriage vees, and streamline wires run across from one wheel centre to the other. Details of the wheel construction are shown in some of our sketches.

Concerning performance, there is little need to say more than that the "Tiger Moth" has covered the 100-km. course at an average speed of 186·45 m.p.h., and has reached a height of 20,000 ft. The latter figure can certainly be improved upon, since during the flight the high-speed propeller was used, and there is little doubt that in the next attempt Captain Broad will reach a height of between 25,000 and 30,000 ft. On the recent altitude attempt, the machine, at 20,000 ft., was still climbing at the rate of about 1,000 ft. per minute.

Following are the main characteristics of the "Tiger Moth":—

Wing span, 22·5 ft. (6·86 m.).
Wing area, 76·5 sq. ft. (7·12 m^2).
Weight, empty, 618 lbs. (281 kgs.).
Petrol (16·75 gals.), 124 lbs. (56·4 kgs.).
Oil (2 gals.), 20 lbs. (9·1 kgs.).
Pilot, 143 lbs. (65·0 kgs.).
Total load, 287 lbs. (130·5 kgs.).
Total loaded weight, 905 lbs. (411·5 kgs.).
Wing loading, 11·83 lbs./sq. ft. (57·8 kgs./m^2).
Power Loading, 6·96 lbs./h.p. (3·17 kgs./h.p.).

"Everling Quantities"

"Wing Power" 18·3 h.p./m^2 (1·7 h.p./sq. ft.).
"High-speed Figure," 26.
"Altitude Figure," 4·5.

The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

Edited by C. M. POULSEN

September 22, 1927

CONTENTS

EDITORIAL VIEWS

Two articles published in this issue of THE AIRCRAFT ENGINEER deal with the same subject, *i.e.*, that of handicapping by formula. Both were written several weeks ago, but in the absence of the Editor in connection with the Copenhagen Aero Show, they could not be prepared for publication in last month's issue.

Mr. C. C. Walker, Chief Engineer of the de Havilland Aircraft Company, expresses the very sound view that we should, in the future, have at least one race a year in which handicapping is by formula, and which should tend to "improve the breed."

Mr. Walker discusses the basis for a formula, and advocates the use of span^2 per h.p. rather than wing area per h.p. or "wing power," as the span is one of the characteristics of an aeroplane for which there is no substitute. Span, Mr. Walker contends, is the important feature, and he points out that in the case of an overloaded machine, increase of chord is no cure, but increase of span *is*.

The Walker Formula is $V = K \times \sqrt[3]{\frac{bhp}{S^2}}$, and as a suitable value of K he suggests 261·3, this value being determined from the Curtiss R3·C1 machine. In one of his figures Mr. Walker has plotted a number of machines, using the known performance in the King's Cup race, and many of these fall very close to the suggested curve.

Mr. Walker's article was prepared before the de Havilland "Tiger Moth" made its record speed flight, but we have thought it of interest to examine how that machine would fare under the suggested formula. As the power of the de Havilland engine is about 130 b.h.p., and the wing span 22·5 ft., the ratio of b.h.p. to span^2 is 0·256, and the cube root of that 0·635. Using the value of 261·3 for K, the speed with which the formula would credit the "Tiger Moth" is 165·9 m.p.h., whereas actually the machine did 186·45. Thus in this particular case the formula underestimates the speed, and a K of 293·6 would be necessary to bring the "Tiger Moth" on to the curve.

HANDICAP FORMULÆ.

By C. C. WALKER, A.M.Inst.C.E., F.R.Ae.S.

The term "handicap" is really not a suitable one for formula racing, for the handicapper's object is to bring every contestant to the winning post at the same time, while the object of a formula is to do what is almost the converse of this—namely, to separate them out in their order of merit on the particular formula used. In practice, however, there will be many machines of nearly equal cleanness, and the result will be indistinguishable from a handicapped race among these machines. Others will either be outclassed or will not have entered. There is, however, no real comparison between the two methods, for one is designed to produce close finishes which will appeal to the public and make flying meetings popular, and the other is calculated to improve the breed of aircraft and is of the greatest possible technical interest. It would seem, therefore, that there should be one important formula contest each year; that the formula should, while not being unalterable in the light of experience, be a stable affair which could be designed to; and that any alterations should not be made operative until, say, a year after their announcement. It then becomes important that the formula, instead of trying to reconcile ancient and modern, efficient and inefficient, should be one firmly grounded on science and likely to encourage efficiency.

The Basis for a Formula.

It can easily be shown that an aeroplane flying all-out near the ground, which possesses a sufficient reserve of horse-power to ensure a moderately good "get-off" will be very little affected in its top speed by small variations of wing loading. It will probably be flying at a lift coefficient of less than 0·12, and below this that part of the drag which is due to supporting the weight is small compared to the frictional drag, and may be omitted from the formula.

This results in much simplification and avoids the troublesome necessity of weighing the competing machines. The ideal formula, then, would be one which would have the effect of placing machines in the inverse order of their frictional drag when referred to the brake horse-power they make use of and to some quality connected with what may be termed for the moment, their capacity. This capacity may be one ranging from pure speed to big load carrying, and is, of course, connected with the size of the machine (per horse-power). The quality in question is one which the formula should duly allow for, letting the prize go to the machine which goes fastest having regard to its horse-power and its capacity.

Surface per Horse-power or Span² per Horse-power.

It has always been the writer's practice to compare the speed of aircraft on a basis of wing area per horse-power.* This is very convenient for biplanes of normal proportions, but it will not give a good comparison between biplanes and monoplanes. The reasons for this are fairly obvious: for instance, a monoplane and biplane when built for the same purpose have about the same drag, while the surface of the monoplane is, in general, smaller. Examples of this might be quoted, but it is better not to appeal to examples too much, as statistics can always be produced to prove anything. It is essential, above all, that any formula for racing should be based on sound theoretical grounds: it should also be free from the necessity of reconciling past examples, and it is for this reason that the writer is of the opinion that the span and brake horse-power should be the basis for formula racing. Before passing on to this, however, the greatest drawback of the wing area basis may be indicated. Every competitor will do his best to defeat the formula, and formulæ in general tend to produce freakish craft. Now, mere area may be increased to a very large extent without affecting the machine structurally, or lowering its speed materially, by adding largely to the chord and keeping the spar depth the same. An area/horse-power formula would, undoubtedly, tend to produce rather grotesque aspect ratios, and the machines which were good on formula would carry a lot of surface of which no effective use could be made beyond getting a good handicap. The case is very different as regards span, which will now be considered.

Span and Brake Horse-power

Span is the dimension for which there is no substitute. As was shown by Lanchester a long time ago, the drag of an aeroplane consists of two parts, the frictional drag and that drag which is incurred because a certain weight is carried at a certain speed on a certain span (now called induced drag). It is the first part which is under the control of the designer, the second part being a law of nature. This second part depends on no other dimension but the span.

If an aeroplane has a big span for its B.H.P., it can carry a big load for its B.H.P. If it has a small span it will have a high speed, and low load capacity. Both types, from racing to heavy load carrying, should have their chance on the formula, provided the frictional drag has been kept as low as possible. Now if an aeroplane is found to have too high a loading to "get off" and climb well on its W./H.P., increasing the area by extending the chord will have little effect. The induced drag (which is the dominating part in this condition) remains the same at the same forward speed. Put shortly, and without all the qualifying statements, increase of chord is no cure for an over-loaded machine, but increase of span is. In other words, the general capacity of an aircraft in any direction is governed by its span. In a speed contest, then, that machine which goes fastest for its span and its B.H.P. should win (the square of the span is the quantity involved).

As regards the possibility of defeating the formula by increasing the span, this is on quite a different footing from an increase of chord. Stresses cannot be dodged on wing extensions which must be looked well after structurally, and which will add resistance. If anything very freakish tended to appear a new definition of span such as $\frac{\text{Area}}{\text{Mean Chord}}$ would put it right.

What has been said so far amounts to this: That it is desirable and justifiable to handicap by means of dimensions, that there is only one dimension—the span—which is fundamentally concerned in all the capabilities, other than racing, of an aircraft, and that since the idea of a formula is to admit not only pure speed machines, they should be handicapped by the dimension which determines their other capabilities.

Monoplanes and Biplanes

If span is accepted as the criterion, it will be necessary to define the term. It will be evident that the overall span of a monoplane and a biplane have not the same significance. The extra wing of the biplane does something towards reducing the induced drag and should, therefore, get some allowance in the formula. If the basic idea of the formula be accepted, namely, that any aeroplanes having the same induced drag when doing the same job, should have the same handicap, the portion of the biplane's extra wing that should be added to give the equivalent monoplane span, is easily found.

In Fig. 1, A represents a monoplane of 20 ft. span carrying some load at a speed which causes a certain induced drag. In B is shown two separate non-interfering planes dividing the load between them and having the same induced drag as the monoplane. Since the induced drag depends on the square of the span, each of these wings must have a span of 14·14 ft., for the combination to have the same induced drag as the monoplane. This is the case of the infinite gap equal-wing biplane, and cases A and B should be equally handicapped, for they are inherently capable of doing the same job for the same induced drag.

If the "span for handicapping" of A is 20 ft., and the biplane is assessed by adding a suitable fraction of one wing to the other, the "span for handicap" of B is S_1 + a fraction of S_2, which will total 20 ft., or $S_1 + 0{\cdot}41\ S_2$ for the biplane without any interference. This is one extreme case, the other being where the gap is infinitely small, and then Case A is considered to be two 20-ft. planes superposed. In this case $S_1 + O \times S_2 = 20$ ft., so that the allowance for the other plane of the biplane must be something between $S_1 + 0{\cdot}41\ S2$ and S1, depending on the Gap/Span ratio. There is also the unequal wing biplane to be considered. Theo-

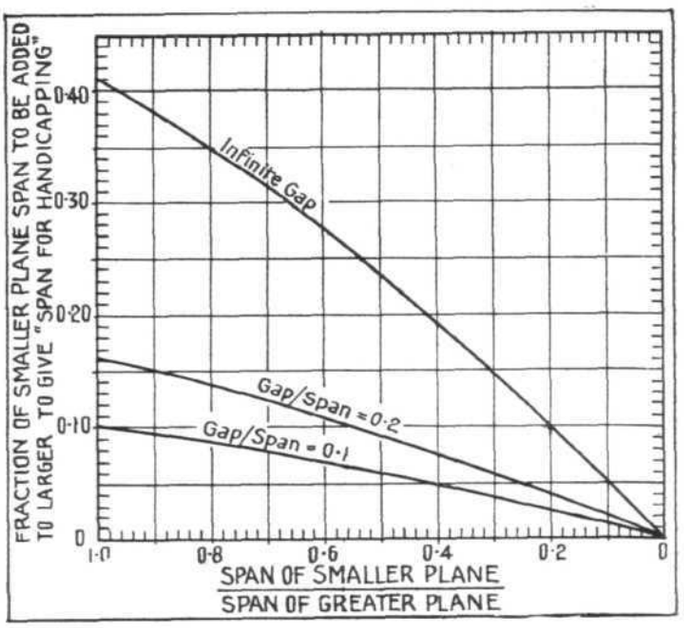


Fig 2.—The general scale connecting gap-span ratio of equal wing biplanes is taken from American N.A.C.A. Report No. 151 by Max Munk.

* This is the quantity called "Wing power" by Professor Everling in article in THE AIRCRAFT ENGINEER of Nov. 25, 1926.—ED.

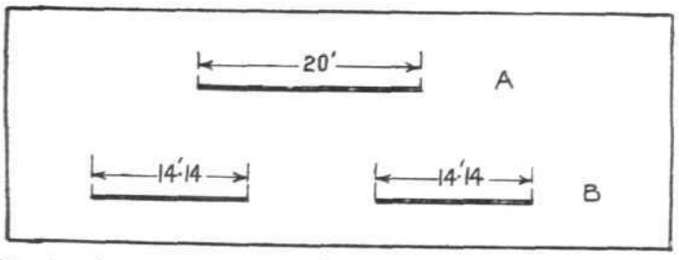


Fig. 1.—A represents a monoplane of 20 ft. span carrying some load which causes a certain induced drag. In B is shown two separate non-interfering planes dividing the load between them and having the same induced drag as the monoplane. Cases A and B should be equally handicapped, for they are inherently capable of doing the same job for the same induced drag.

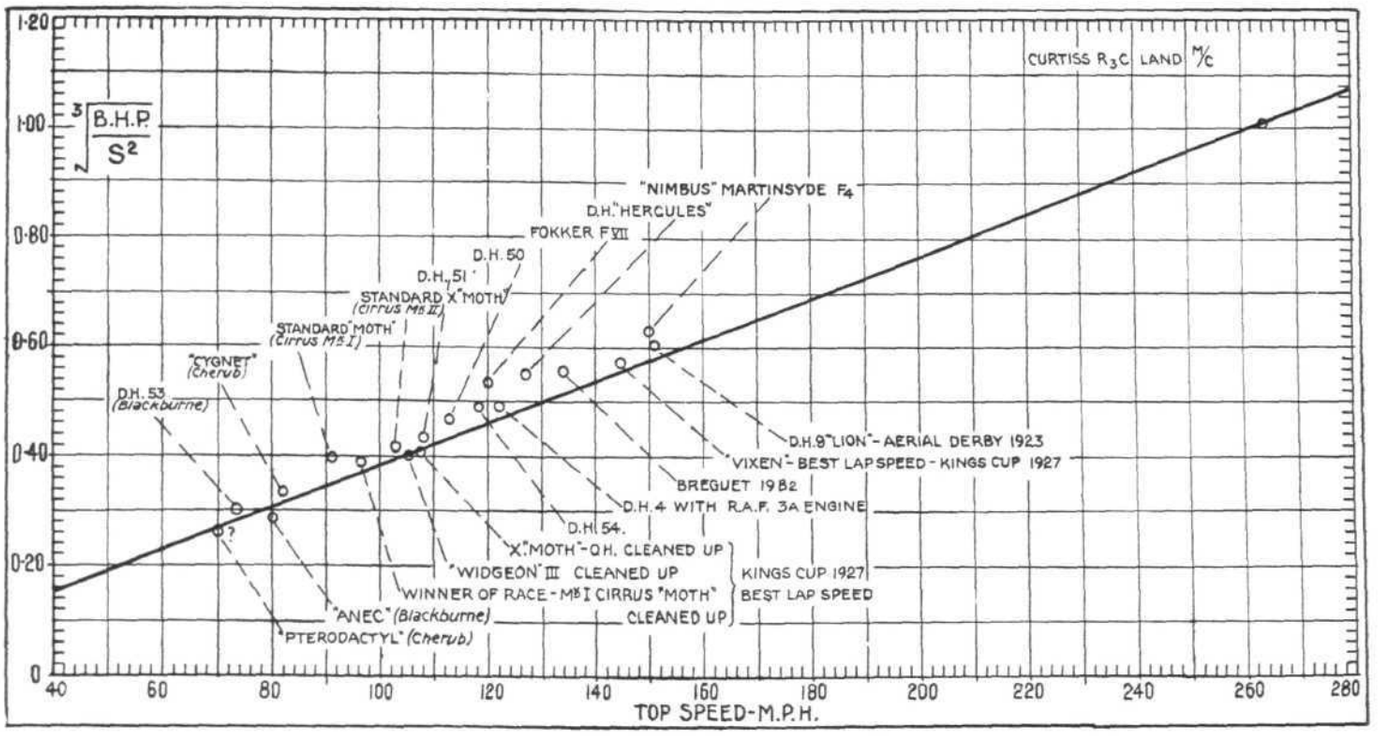


Fig. 3.—Formula suggested by Mr. Walker last February, which has been brought more up-to-date by adding some speeds estimated from the King's Cup performances. It is suggested that this formula would form a reasonable basis for discussion and modification. The machine used for fixing the constant K is the Curtiss R3.C1., and the reference line is given by the equation

$$V = K \times \sqrt[3]{\frac{B.H.P.}{S^2}}$$

where $K = 261 \cdot 3$ and $S = S_1 + 0 \cdot 125 \times S_2$, and $S_1 =$ span of larger plane, $S_2 =$ span of smaller plane.

retically every different amount of inequality in the two wings will require a different factor, although having the same Gap/Span ratio. Fig. 2 shows the whole picture, which can be worked out from first principles. The general scale connecting Gap/Span ratio of equal wing biplanes with the equivalent monoplane is taken from N.A.C.A. Report No. 151 by Max Munk.

It is probably unnecessary to go for great refinement in this factor so long as it is reasonably representative. $S_1 + 0 \cdot 12 S_2$ looks about right, or perhaps on the large side if it is to embrace all cases. Neither monoplanes nor biplanes will then be particularly favoured. In Fig. 2 two rather extreme cases of Gap/Span ratio have been taken.

The Actual Formula

This year's King's Cup Race has demonstrated that the speed which the formula credits the entrants with must be reasonably correct for the cleaner machines. Fig. 3 shows a proposal for a formula prepared by the writer, last February, which has been brought more up-to-date by adding some speeds estimated from the King's Cup performances, and which would probably form a reasonable basis for discussion and modification. It will be seen that this is the same as this year's formula, except for the biplane allowance, and the constant which fixes the actual speed of each machine. It is by no means suggested that the constant used in this curve is the best, but it is of some interest to see what machines of various speeds, but all fast in their class, would have to do to tie with the one which has been taken to fix the constant, *i.e.*, the Curtiss R3.C_1 doing 264 m.p.h.

The writer has rather limited, and possibly inaccurate, information, except as regards his own firm's machines, and offers this as the explanation of why these are so numerous in the figure.

This curve seems to indicate that although the standard set is rather a high one, it is possible to design aircraft to be fast on this formula, whether their top speed is 70 or 270 m.p.h. It also seems likely that large and small aircraft could compete equally well, for it must be remembered that no large aircraft have yet been really cleaned up for a race. A curve based on area per horse-power would also show a good conformability with the various examples, except perhaps in the case of the monoplanes. The object of a formula, however, should be to get some standard to design to, and the objections mentioned above to the area/H.P. scheme still stand.

The argument may then be summed up as follows: Span is the fundamental dimension of aircraft which determines their capabilities.

Chord is a more or less incidental dimension which, to a certain extent, regulates landing speed. There are, however, substitutes for it, such as high camber, slots, flaps, etc.

The idea at the back of a formula should be that if every size and speed of aircraft are to be catered for, machines which are slow should be handicapped on the assumption that they possess the virtues attaching to low speed, while low speed, which is due to mere friction and inefficiency, should be discriminated against. Also that it is the speed quality which the formula tests.

Engine Power

The present arrangement of taxing a machine with the type-test B.H.P., while fairly simple, is unsatisfactory from the progress point of view. It is now immaterial to the designer whether he uses a light or heavy, large or small, engine. If an engine is improved so as to give more horse-power, the new type test figure is taken and the machine taxed with it, so that at present there is no incentive to progress.

It would obviously be better to use weight or swept volume as a basis for fixing engine power, and allow the designer to get whatever power he can, so long as the formula race is a fairly long one. Experience has shown that there is not too much reliability in hand now, and designers must be credited with sufficient commonsense to wish, at least, to get round the course. Under these conditions, racing would be more interesting, and there would not necessarily be the present obligation to use full throttle all the time.

Another way of assessing the horse-power would be on the actual petrol consumption. This, while giving the greatest technical interest of all methods, must unfortunately be ruled out, as there would be no racing element in it whatever if the winner was not known until calculations had been made.

In concluding these notes, it must be admitted that it is difficult to cover all the ground in reasonable space. Although span and brake horse-power seem to be the best quantities to use, there are others, such as "Speed range per W/H.P." This would have an advantage over the Area per H.P. basis in that any extra surface or devices carried to extend the speed range would have to be operative, but it has many drawbacks, one of which is the difficulty of determining stalling speeds at the last minute. On the whole, a modification of this year's formula seems the most satisfactory solution.

HANDICAPPING IN THE KING'S CUP RACE.

By H. A. METTAM, M.A., A.F.R.Ae.S.

One very important lesson can be learnt from the working of the handicap formula used in the King's Cup Race. This point has already been brought out in the description of the race given in FLIGHT of August 4, but it is so fundamental that it may well be considered still further. If machines of widely differing speeds are taking part in a race, the handicapper must not deliberately underestimate speeds by a constant percentage, as this actually has the effect of ruling out all the fast machines. This is clearly shown by the fact that the "Avenger" would have had to lap at 244 m.p.h., and the "Vixen" at 165·2 m.p.h., to catch the Anec II, flying at 75·4 m.p.h., which is quite close to her actual speed over the first lap.

It seems very curious that this point should apparently have been missed by everybody concerned, but it is, perhaps, not quite so strange when we remember that the handicap speeds must still, in spite of the statement above, be underestimated when compared with true top speeds over a measured mile. The difference between this true top speed and the speed which can be attained round a course depends on the length and nature of the course, the strength and direction of the wind, and the course-keeping ability of the pilot. The last point cannot be covered by any formula, while windage corrections cannot be applied in a race which goes on all day. A machine will put up a better average round a long course with few turning points, and a relatively small portion of time spent in getting-off, than the same machine would do on a very short course with several turning points and in which getting-off time has an important influence. The change in possible speed from one course to another cannot be simply determined, so here we have another complication to add to the many difficulties of the handicapper's art.

It is unfortunate that, owing to the small number of machines completing the course, the King's Cup Race did not provide very much data on which to judge the use of $\frac{HP}{[\text{Equiv. Span}]^2}$ in the formula; however, the mere fact that the Moth X started so much before the ordinary Cirrus II Moth, which is well known to be the slower of the two, shows that there is something wrong. It would be interesting to see how the various machines would have come out on the 1926 formula using "wing power," but sufficient data is not available.

It was suggested in FLIGHT of August 4 that better results could be obtained by using a higher value of K in the present formula. The values of K required to bring the formula into line with the over-all speeds and best lap speeds of the various machines have been determined. The average value for best lap speeds is 19, and for overall speeds 17·6, so the writer chose K = 18 and worked out the times for the six machines which completed the course. The effect of this is to leave the order of finishing unchanged, but to close up the gap between first and third from 56 mins. to 5 mins., and the gap between first and last from 80 mins. to 30 mins.

This increase in K would therefore have made a closer finish, while the fact that the Vixen III closes up on the winning Moth demonstrates that such a change makes matters easier for the faster machines. A further increase of K to 21 would have made the fastest machine also the first home.

In FLIGHT of August 4, there is a table of speeds which machines would have had to attain under the K = 12 formula in order to equal the Moth X when that machine was assumed to average 103 m.p.h. It happens that K = 21 gives the Moth X a handicap speed of this amount. The table of handicap speeds on this new basis, given below, may therefore be compared directly with the original table, and also with the speeds actually attained.

No.	Machine and Engine.	Speed, m.h.p. K = 21.
6	Anec II, "Cherub"	79·1
4	Halton Biplane, "Cherub" ...	84·8
27	C.L.A. 4, "Cherub"	87·2
5	Moth, "Cirrus I"	97·1
9	Moth, "Cirrus I"	99·3
26, 18, 15	Moth, "Cirrus II"	103·0
12	Avian, "Cirrus I"	105·1
10	Widgeon III, "Genet"	105·2
2	Bluebird, "Genet"	106·3
3	Moth, "Cirrus II"	107·5
22	Widgeon III, "Cirrus II"	108·8
23	Avian, "Cirrus II"	110·0
8	Avian II, "Cirrus II"	110·0
13	Alpha-Avian, "Alpha"	114·0
14	Avian, "Cirrus II"	115·2
24	D.H. 9, "Nimbus"	133·1
19	Vespa, "Jupiter"	139·0
7	Horsley, "Condor"	141·9
1	F. 6, "Viper"	144·0
16	Tiger Moth, "Cirrus II"	148·0
20	Vixen, "Lion"	149·5
25	Boreas Martinsyde, "Nimbus" ...	159·3
21	Badminton, "Jupiter"	177·8
11	Avenger, "Lion"	198·2

A great variety of speculative results may be deduced from these comparisons, but there does not seem to be any reason for thinking that the higher K would really give satisfactory results over the whole range of machines. We are therefore forced to the conclusion that handicapping can only be done satisfactorily by scrapping the formula and working from known performances.

A SIMPLE THEORETICAL METHOD OF ANALYSING AND PREDICTING AIRPLANE PERFORMANCE.

By IVAN H. DRIGGS.

(*Continued from p. 54*)

Maximum Rate of Climb

Similar to the ceiling there is a rate of climb corresponding to every value of V throughout the range, but it is the maximum of these values which is the most interesting. We know from experience that variations of speed between quite large limits about the best speed have but little effect upon the rate of climb due to the fact that the curves P_a and P_R are nearly parallel for a long distance. If a line be drawn from the origin tangent to the P_R curves, the point of tangency will very closely determine the speed of best climb. Point E_{pR}, Fig. 1.

The slope of such a line equals $\frac{P_R}{V}$, and since this line is tangent to the curve of P_R its slope is a minimum. Therefore dividing equation (7) by V, differentiating $\frac{P_R}{V}$ against V, and placing the differential equal to zero, a value for V at climb or V_{cl} is found.

$$V_{cl} = 18{\cdot}4 \left(\frac{F_i}{F}\right)^{1/4} \qquad (27)$$

$$R.C. = (P_a - P_R)\frac{33000}{W}$$

R.C. = Rate of Climb in feet per minute.

Following a reasoning similar to that used in the case of the ceiling proof :—

$$R.C. = [33{,}000\, F_p e_{max.} K_p - 3588\, F_i^{3/4} F_r^{1/4}] \quad (28)$$

Where

$$K_p = \left(\frac{V_{cl}}{V_{des.}}\right)^{1/2}$$

Summary

Rate of Climb

$$R.C. = 33{,}000\, F_p e_{max.} K_p - 3588\, F_i^{3/4} F_r^{1/4} \quad (28)$$

$$K_p = \left(\frac{V_{cl}}{V_{des.}}\right)^{1/2}$$

$$V_{cl} = 18{\cdot}4 \left(\frac{F_i}{F_r}\right)^{1/4}$$

$$e_{max.} = 1 - \frac{0{\cdot}425\, P_{ac}^{1/6} N^{1/3}}{V_{des.}^{5/6}}$$

The writer is warranted in presenting the above theory only in the light of very excellent results obtained in checking flight tests. In order to show definitely the degree of accuracy obtainable, thirty-one test reports are chosen from which absolute ceiling and rate of climb are determined. The parasite resistance factor F_p is first calculated from the observed high speed.

Before performing this calculation, however, an expression for the altitude factor of relative power p_R must be determined. Bairstow found that :—

$$p_R = \frac{(d_R - 0{\cdot}12)}{0{\cdot}88} \text{ for one particular engine.}$$

while Booth gives

$$p_R = \frac{(d_R - 0{\cdot}161)}{0{\cdot}839} \text{ as an average.}$$

The writer has found personally (in applying Bairstow's method of reduction) that the value of the power factor for a number of cases lies between

$$P_R = \frac{(d_R - 0{\cdot}13)}{0{\cdot}87} \text{ for Liberty and Lawrance J—1}$$

and

$$P_R = \frac{(d_R - 0{\cdot}12)}{0{\cdot}88} \text{ for the Wright motors in agreement with Bairstow.}$$

(d_R in above expressions = Relative density)

In the following calculation as a fair average

$$P_R = \frac{(d_R - 0{\cdot}12)}{0{\cdot}88}$$

For the determination of F_r the design V of the propeller has been assumed to be the high speed observed in flight test at the noted r.p.m.

Since the value of the maximum lift coefficient full scale is unknown for the airplanes of this series, Case I is assumed to apply in every case.

Discussion.

Absolute Ceiling.—The agreement between observed and calculated results in nearly every case is highly satisfactory, and probably exactly as accurate as the test data. In a few cases the discrepancies are rather large, however. The Martin Bomber stands out with a variation of about 19 per cent. between calculated and observed figures. The writer does not believe that this method falls down in the case of the MB-2, but rather that the maximum propeller efficiency found by equations (11) is too large. There is also some error introduced by assuming Case I to apply. This airplane has such a large parasite that it undoubtedly falls under Case II. If the speed of minimum power observed during test be substituted in equation (24), the ceiling comes out 15,000 ft. This is still far from satisfactory, but is the best that can be done at present.

Undoubtedly, in a great number of cases some error has been introduced by the use of the formulæ of Case I. In fact, if the $K_y$max. of the wings be substituted in equation (26) in nearly all cases (where $K_y$max. is known) Case II will be found to apply. This suggests that either the airplane $K_y$max. is considerably greater than that of the airfoil or that the errors introduced by the use of Case I are largely compensating. The simpler equation (23) is probably sufficiently accurate for all purposes. Case II is theoretically more sound, but due to the fact that Vmin. is rarely known to any degree of accuracy it is not recommended for general use ; however, in cases where a comparative estimate between a number of designs is being made, Case II will probably give the most satisfaction. The effect of using either the formulæ of Case I or II will be shown in the complete example to be worked out later.

Another source of error lies in assuming that the power decrease of altitudes is the same for all engines. Probably this explains the discrepancy between results calculated and observed for the JL-6. The B.M.W. motor is designed especially for altitude work.

TABLE I.

Airplane.	Rpt. No.	W	S	Kb	Pm	N	Vmax.	e max.	Fp	Fi	Fr	pr5/4	pr	Ceiling. Calc.	Ceiling. Obs.	Vdes	R.C. Calc.	R.C. Obs.
IL–1	S–1863	5,686	46	1·083	408	1,640	107	0·74	0·0719	0·769	0·00428	0·545	0·616	13,250	13,300	110	637	685
XB1–A ..	S–1654	3,590	39·4	1·087	342	1,890	126·5	0·755	0·0954	0·655	0·00376	0·378	0·459	20,000	20,400	126·5	1,080	1,070
PW–1	S–1874	3,005	32	1·085	350	1,950	146	0·776	0·1163	0·845	0·0031	0·353	0·435	21,150	21,000	140	1,280	1,250
MB–3	S–1774	2,548	26	1·125	330	1,825	146	0·783	0·1298	0·995	0·0035	0·361	0·443	20,760	20,600	140	1,370	1,360
XB1–A ..	D52–1	3,679	39·4	1·087	327	1,800	121·5	0·752	0·088	0·671	0·00387	0·412	0·492	18,500	18,700	121·5	955	925
JL–6	S–1414	3,605	43·7	1·00	243	1,445	111·2	0·764	0·0674	0·632	0·00375	0·491	0·566	15,250	15,900	111·2	665	580
VE–7	S–1817	2,269	34·1	1·079	194	1,830	124	0·777	0·0855	0·560	0·0037	0·367	0·449	20,500	21,200	124	1,005	1,050
D.W.C. ..	—	7,216	50	1·112	405	1,635	103·5	0·716	0·0562	0·775	0·00336	0·638	0·698	10,080	10,000	100	410	450
CO–5	—	4,193	36	1·08	415	1,675	137·3	0·771	0·099	0·945	0·00306	0·432	0·51	17,700	18,000	137·3	1,075	1,010
CO–1	S–2023	4,751	55·75	0·90	390	1,660	117·7	0·743	0·082	0·634	0·0039	0·430	0·509	17,700	18,400	117·7	845	775
CO–4	S–2064	4,493	39	1·05	417	1,710	131	0·76	0·093	0·898	0·00324	0·435	0·512	17,600	17,800	131	980	990
V–40	S–1900	2,686	39·4	1·00	334	1,940	144·5	0·778	0·125	0·574	0·0035	0·269	0·35	25,500	25,400	144·5	1,640	1,575
D–7	S–1721	2,462	25·3	1·06	352	1,975	151	0·785	0·143	1·127	0·0035	0·36	0·441	20,900	21,000	150	1,710	1,710
MB–2	S–1655	10,363	74·2	1·02	840	1,690	99·5	0·691	0·081	0·605	0·00567	0·479	0·555	15,600	13,100	100	742	615
PW–8	—	2,784	32	1·08	476	2,315	169·2	0·78	0·165	0·795	0·00292	0·219	0·297	28,700	28,600	135	2,520	2,500
XB1–A(Pack)	—	3,988	39·4	1·087	350	1,900	125	0·75	0·0878	0·727	0·00333	0·417	0·496	18,400	18,500	125	955	940
Messenger ..	—	862	20	1·09	64	1,880	96·7	0·765	0·0742	0·603	0·0064	0·485	0·561	15,450	15,600	96·7	745	710
T–2	—	7,993	70·8	1·00	408	1,643	100·8	0·723	0·051	0·531	0·00291	0·543	0·614	13,300	—	100·8	440	400
PW1–A ..	—	3,075	31·2	1·096	346·5	1,880	134	0·776	0·1127	0·878	0·00375	0·400	0·48	18,900	18,800	146	1,215	1,212
PW–2	—	2,788	37·66	1·00	320	1,845	132	0·767	0·115	0·655	0·00414	0·326	0·409	22,400	21,800	132	1,380	1,262
PW–2A ..	—	2,799	37·75	1·00	322	1,865	136·1	0·7715	0·115	0·655	0·0038	0·319	0·401	22,850	23,000	136·1	1,400	1,332
PW–2B ..	—	2,976	32·1	1·00	352	1,850	140	0·7735	0·1183	0·962	0·00354	0·389	0·47	19,400	18,600	140	1,350	1,300
PW–9	—	2,971	32·1	1·034	440	2,380	156·7	0·77	0·148	0·900	0·00323	0·306	0·388	23,400	22,850	156·7	1,815	2,055
PW–6	—	2,763	28·0	1·069	335	1,765	138·5	0·778	0·1211	1·028	0·00345	0·400	0·48	18,900	18,200	138·5	1,380	1,285
USAC–11 ..	—	3,746	41·6	1·065	425	1,710	133	0·764	0·1135	0·634	0·00397	0·325	0·407	22,500	21,500	138	1,360	—
DH–4	—	4,297	42·5	1·072	421	1,700	123·7	0·75	0·098	0·69	0·00408	0·39	0·471	19,400	17,600	123·7	1,090	1,000
TA–3	—	1,693	31	1·07	86·8	1,338	83·8	0·754	0·0513	0·514	0·00636	0·598	0·663	11,400	12,300	83·8	418	553
TA–5	—	2,215	34·8	1·062	210	1,790	103·8	0·756	0·095	0·652	0·00665	0·423	0·500	18,200	19,000	103·8	1,025	900
Orenco "D"	—	2,820	30·5	1·086	330	1,810	139·5	0·778	0·117	0·855	0·00356	0·363	0·445	20,600	20,250	139·5	1,380	1,140
TW–4	—	1,967	41·7	1·00	102·5	1,485	85·7	0·745	0·0521	0·3783	0·00621	0·492	0·567	15,200	14,800	85·7	507	450
Morane ..	—	1,458	34·5	1·00	83	1,285	94·3	0·782	0·0569	0·39	0·00547	0·44	0·519	17,300	16,600	94·3	622	615

Rate of Climb.—The agreement here is still very good, especially in the light of the assumptions made. In every case (except where known) the design speed of the propeller is taken as the same as $V_{max.}$ If any of the airplanes of the above list were using propellers designed with somewhat lower pitch that fact would show up immediately in the rate of climb.

Application to Performance Calculation.

High Speed.—

$$\frac{F_p}{F_r} e_{max.} K_p V_{max.} - \frac{F_i}{F_r} = 0 \cdot 00000872 \, V_{max.}^4 \quad (13A)$$

The linear side of equation (13A) depends largely for its value upon the factor of resistance F_r. This quantity, unfortunately, cannot be calculated by any simple method with a very great degree of accuracy. For rather approximate work, however, the equivalent flat plate area of structural parasite may be estimated by comparison with a few standard types. The profile drag of the wing is easily calculated from model tests, and then the parasite area of wings determined.

$$F_r = \frac{A_p}{W} = (A_p) \text{ structure} + A_p \text{ wing}$$

$$A_p \text{ wing} = \frac{\text{Min. profile drag coefficient} \times \text{wing area}}{0 \cdot 00327}$$

In the case of an unusual design or when the greatest possible accuracy is desired the summation method is probably the best. The resistance of each separate item is calculated by the use of data pertaining to the individual resistances of these structural parts. The sum of the drags of all the parts equals the resistance of the whole airplane less wings. The computation of F_r then follows naturally.

The use of equation (13A) and Fig. 3 should be sufficiently clear from the previous work and examples to follow. It is first necessary to estimate $V_{des.}$ and $V_{max.}$ in order that $e_{max.}$ and K_p may be evaluated. If after a trial the estimated High Speed is too far from that calculated, the process should be repeated.

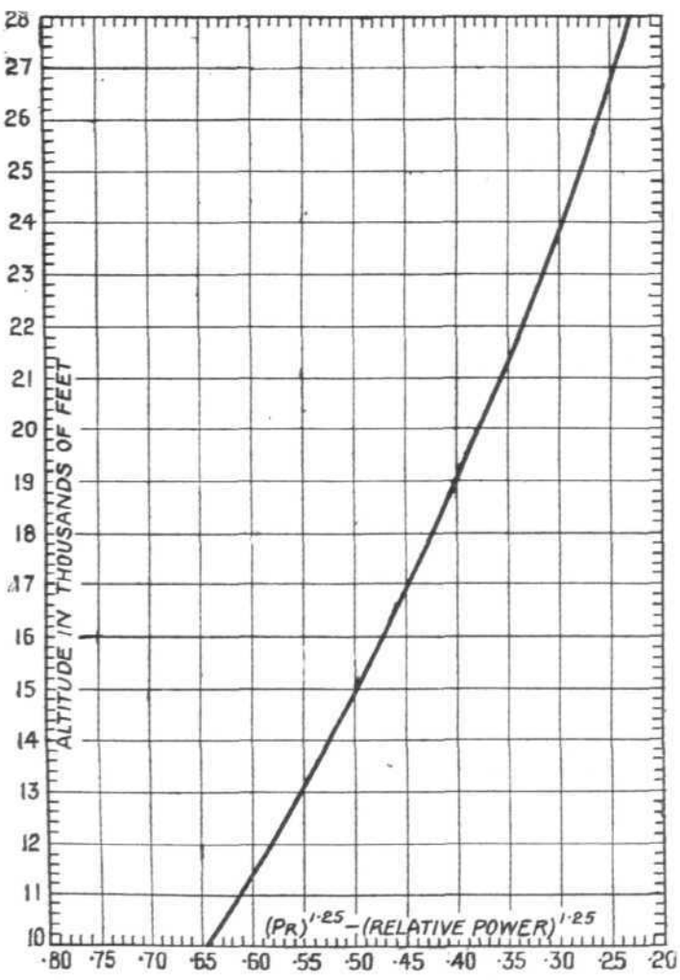


Fig. 4: (Relative Power Factor) $^{1 \cdot 25}$ against Altitude.

Rate of Climb and Ceiling.—After F_r has been determined as outlined above, the application of the formulæ as developed above will give Rate of Climb and Absolute Ceiling.

Time to Climb.—Time to altitude is calculated by standard methods assuming that the Rate of Climb *vs* Altitude Curve is a straight line.

Example I.—

Airplane = Fokker D-8.

Data—

Total weight	...	1,238 lbs.
Span of wing (monoplane)	...	27·7 ft.
Power	...	137 at 1,390.
Wing Area	...	108 sq. ft.
$K_p$max. (from model test)	...	0.00397
A_p (total) (from flight test)	...	7·66 sq. ft.

$$F_p = \frac{137}{1238} = 0 \cdot 1106$$

$$F_i = \frac{1238}{(27 \cdot 7)^2 \times 3} = 0 \cdot 538$$

$$F_r = \frac{7 \cdot 66}{1238} = 0 \cdot 00619$$

$$V_{des.} = V_{max.} = 115 \text{ (Flight Test)}$$

$$e_{max.} = 1 - \frac{0 \cdot 425 \, P_m^{1 \cdot 6} N^{1 \cdot 3}}{(V_{des.})^{5 \cdot 6}}$$

$$= 1 - \frac{0 \cdot 425 \times 2 \cdot 27 \times 11 \cdot 16}{49 \cdot 9} = 0 \cdot 784$$

$V_{max.}$ will not be calculated since F_r was initially determined from flight test. The purpose of this example is to show the differences between Case I and Case II for Ceiling.

Absolute Ceiling—

Case I

$$p_R^{3/4} = \frac{0 \cdot 095 \, F_i^{3/4} F_r^{1/4}}{F_i e_{max.} K_p}$$

$$K_p = \left(\frac{V_{MP}}{V_{des.}}\right)^{1 \cdot 2} \qquad V_{MP} = 14 \left(\frac{F_i}{F_r}\right)^{1/4}$$

$$V_{MP} = 14 \left(\frac{0 \cdot 538}{0 \cdot 00619}\right)^{1/4} = 42 \cdot 8 \text{ m.p.h.}$$

$$K_p = \left(\frac{42 \cdot 8}{115}\right)^{1/2} = 0 \cdot 61.$$

$$P_R^{3/4} = \frac{0 \cdot 095 \times 0 \cdot 538^{3/4} \times 0 \cdot 00619^{1/4}}{0 \cdot 1106 \times 0 \cdot 784 \times (0 \cdot 61)}$$

$$= 0 \cdot 316.$$

From Fig. 4,

Absolute ceiling = 22,960

Absolute ceiling = 22,100 ft. (flight test).

A large portion of the discrepancy in both of the above cases is very likely due to the fact that the rotary engine used on the D — 8 loses power somewhat more rapidly than is assumed.

Rate of Climb.

$$R.C. = 33{,}000 \, F_p e_{max.} K_p - 3588 \, F_i^{3/4} F_R^{1/4}$$

$$V_{cl} = \frac{42 \cdot 8}{14} \times 18 \cdot 4 = 56 \cdot 2$$

$$K_p = \left(\frac{56 \cdot 2}{115}\right)^{1/2} = 0 \cdot 699$$

$$R.C. = 33{,}000 \times 0 \cdot 1106 \times 0 \cdot 784 \times 0 \cdot 699 - 3{,}588 \times 0 \cdot 628 \times 0 \cdot 28$$

$$= 2{,}000 - 632$$

$$= 1{,}368 \text{ ft./min.}$$

R.C. = 1,500 ft./min. (flight test).

This is not very close to observations, but, since no data is available on the propeller pitch, nothing further can be done.

(To be concluded.)

FLIGHT

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE COMMITTEE—SEPTEMBER 14

Present.—Brig.-Gen. Lord Thomson, P.C., C.B.E., D.S.O., in the Chair; Sir Alan J. Cobham, K.B.E., A.F.C.; Lieut.-Col. M. O. Darby, O.B.E.; Mr. E. J. B. How; Wing-Commdr. T. O'B. Hubbard, M.C., A.F.C.; Col. F. Lindsay Lloyd, C.M.G., C.B.E.; Lieut.-Col. Sir Francis K. McClean, A.F.C.; Mr. F. Handley Page, C.B.E.; Major H. A. Petre, D.S.O., M.C.; Harold E. Perrin, Secretary.

Members Elected.

The following new members were elected:—Vicomte Jacques de Sibour; Flight-Lieut. Francis Joseph Fogarty; A. W. Hubble; Flight-Lieut. Sydney Leo Gregory Pope; Lionel Schuyler St. Elmo Punnett; Brian Bedford Frank Russell; Pilot-Officer Anthony George Somerhough; Captain Oliver Henry Douglas Vickers; Flying-Officer John Hugh Coulson Wake; Squadron-Leader John Kilner Wells; Charles Arthur Winter.

Aviators' Certificates.—25 aviators were granted certificates and their names will be published next week.

F.A.I. Zurich Conference.—The report of the Club's Delegate, Lieut.-Col. M. O'Gorman, on the Conference of the F.A.I., held at Zurich on August 12–18, 1927, was received, and the following is a *résumé* of certain decisions arrived at:—

Schneider Cup.—The proposal of Great Britain that the race should be run every two years, instead of annually, as at present, was not agreed to. In view of this decision, Great Britain proposed that no alteration in the rules should be made without two years' notice. This was agreed to.

Nationality of Records.—World's records shall belong to the nationality of the pilot, irrespective of the territory on which the record is made. Where two or more pilots are concerned, the nationality of the first pilot mentioned will be taken.

Carrying of Parachutes.—The obligation to carry parachutes on all flights for world's records was rescinded.

Records for Gliders.—Local records only will be recognised in future. All previous records are abolished.

Light Aeroplane Records for Seaplanes.—It was decided to have a special category for seaplanes in the Light Aeroplane Class, and clubs were invited to send in their suggestions as to the limit of weights to be imposed.

Light Aeroplane World's Records

The following performances were reported:—

1st Category Two-Seater.—The Hon. Lady Bailey on D.H. "Moth" 30/80 h.p. Cirrus, July 8, 1927. Height, 5,268 metres (17,283 ft.).

This performance has been confirmed as a world's record by the F.A.I.

3rd Category Single-Seater.—Captain H. S. Broad on D.H. "Tiger Moth," 32/130 h.p. D.H. engine, August 24, 1927. Speed, over 100 kilometres; 300·100 kilometres per hour.

3rd Category Single-Seater.—Captain H. S. Broad on D.H. "Tiger Moth" 32/130 h.p. D.H. engine, August 29, 1927. Height, 5,851 metres (19,196 ft.).

These last two performances have been submitted to the F.A.I. for acceptance as world's records.

Schneider Cup.—The secretary made a brief report on the work of the Schneider Committee, which covered the period from February 9 to September 4.

A request for a postponement of the date of the race for 30 days had been received by the Italian Aero Club from the National Aeronautic Association of the U.S.A., and had been referred to the Royal Aero Club, who had replied that the rules did not allow any postponement, except from day to day on account of unfavourable weather. This action was confirmed.

Offer of Prize by Mr. J. D. Siddeley.—The offer of a prize for an annual competition for the encouragement of private flying was received from Mr. J. D. Siddeley and referred to the Competitions Committee. A letter conveying the thanks of the Club was directed to be sent to Mr. J. D. Siddeley.

Aviation Race Meetings.—Permits for race meetings were granted as follows:—Lancashire Aero Club, for Liverpool Meeting, September 24, 1927; Yorkshire Aeroplane Club, for Sherburn-in-Elmet, October 1 and 2.

International Air Congress—Rome.—The following delegates were appointed to represent the Club at the International Air Congress, Rome, October 20, 1927:—

Brig.-Gen. Lord Thomson, P.C., C.B.E., D.S.O.
Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C.
Sir Alan J. Cobham, K.B.E., A.F.C.

WORLD'S RECORDS

THE Royal Aero Club has been notified by the Fédération Aéronautique Internationale that the following world's records have been granted:—

Class C

Greatest Distance in a Straight Line

Without alighting:—(United States) Capt. Charles A. Lindbergh, New York–Paris, May 20–21, 1927, Ryan Monoplane, 200 h.p. Wright Whirlwind J-5 .. .. 5,809 kms.

Greatest Distance in a Straight Line without Alighting:—(United States) Clarence D. Chamberlin and C. A. Levine, Roosevelt Field (United States) to Helfta (Germany), June 4, 5 and 6, 1927, Bellanca Monoplane, 200 h.p. Wright J-5 6,295 kms.

Class Ca—Seaplanes

Height:—(United States) Lieut. C. C. Champion, Washington, D.C., July 4, 1927, Wright-Apache 425 h.p. "Wasp" 11,581 m.

Class C

Light Aeroplanes—1st Category

(Two-seater, weighing less than 400 kgs.)

Height:—(Great Britain) The Hon. Lady Bailey and Mrs. G. de Havilland, Stag Lane Aerodrome, Edgware, July 5, 1927, D.H. "Moth," 30–80 h.p. Cirrus Mark II 5,268 m.

Greatest Distance in a Closed Circuit:—(Czecho-Slovakia) Capt. Vaclav Vlcek and Capt. V. Charouseck, Prague, July 26, 1927, B. 9·4, 60 h.p. Walter .. .. .. 600 kms.

Light Aeroplanes—3rd Category

(Single-seater, weighing between 200 and 350 kgs.)

Greatest Distance in a Closed Circuit:—(Czecho-Slovakia) Capt. Joseph Hamsick, Prague, July 26, 1927, B. 10.4, 60 h.p. Walter .. .. 1,400 kms.

Useful Load Transported

500 *kgs.*

Speed over 2,000 *kms*:—(Germany) July 31, 1927 205 kms. 407

1,000 *kgs.*

Speed over 500 *kms.*:—(Germany) July 28, 1927 215 kms. 378

Speed over 1,000 *kms.*:—(Germany) July 28, 1927 214 kms, 855

Speed over 2,000 *kms.*:—(Germany) July 31, 1927 205 kms. 407

Greatest Distance in a Closed Circuit:—(Germany) July 31, 1927.. .. .. 2,315 kms. 338

2,000 *kgs.*

Speed over 500 *kms.*:—(Germany) July 28, 1927 215 kms. 378

Speed over 1,000 *kms.*:—(Germany) July 28, 1927 214 kms. 855

Speed over 100 *kms.*:—(Germany) July 29, 1927 216 kms. 107

Greatest Distance in a Closed Circuit:—(Germany) July 31, 1927.. .. .. 1,750 kms. 469

All these records were beaten by Pilot Hermann Steindorff at Staaken, in a Rohrbach-Roland, 3—230 h.p. BMW.:—

1,000 *kgs.*

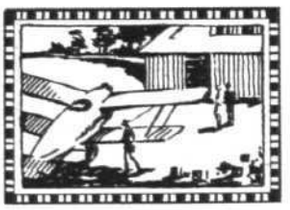
Height:—(Germany) Hermann Steindorff and Lukas, Staaken, August 12, 1927, Rohrbach-Roland, 3—230 h.p. BMW. .. .. 6,805 m.

Class C

Duration:—(Germany) Edzard and Risctics, Dessau, August 3, 4 and 5, 1927, "Junkers" W.33, 230 h.p. Junkers L.5 .. .. 52 hrs. 22 mins. 31 secs.

Greatest Distance in a Closed Circuit .. 4,660 kms. 628

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

PRIVATE  FLYING

A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

BY AIR TO MALTA

By LIEUT. L. G. RICHARDSON, R.N.

[*Purely in the cause of "airmindedness," Lieut. Richardson has written this interesting and informative article on his experiences of a flight to Malta in his privately-owned "Moth." He is attached to H.M.S. Furious (Fleet Air Arm), and chose to spend his summer leave on this trip, in company with his brother, Mr. E. W. A. Richardson. He commences his story with the departure from Lympne but he first flew there from Kentchurch, Herefordshire, via Cowes.—Ed.*]

My brother and I left Lympne at 11.15 a.m. on August 2, bound for Malta, in my standard "Moth" G-EBPO. We each took a small suitcase, one stowed in the locker abaft the pilot's cockpit, and the other between the legs of the passenger in front, which, however, did not get in the way of the dual controls. We carried no extra petrol as weight was being cut down to a minimum. The weather was perfect, with a slight wind behind us, and we reached Le Bourget in 2 hrs. 18 mins. As I wished to call on the Air Attaché in Paris we stayed the night here and proceeded next day to Dijon, Lyons and Avignon.

I decided to try Wakefield's Castrol "R" for my trip abroad in place of Castrol "C," which I had hitherto been using, on account of the very warm temperatures I should experience in the Mediterranean in August. I found the engine ran very well on Castrol "R" and also that the consumption was less, but this oil was very difficult to get in France and Italy. I eventually found that a Bugatti motor agent (if one could be found) was the most likely person to stock it. At Dijon we were unable to get any and used Kervoline, a rather lighter vegetable oil, instead, which seemed to mix quite well.

From Dijon to Lyons we had a good wind behind us at 6,000 ft., so having filled up with petrol at Lyons, we decided to push on as far as possible before the light failed, in the direction of Marseilles, landing if necessary at one of the several aerodromes in the Rhone Valley. Still favoured with a good following wind we averaged 96 m.p.h. over the ground from Lyons to Avignon, but as it seemed doubtful whether we could make Marseilles we decided to land here for the night. We also thought that Avignon would be a more delectable spot at which to stay the night than Marseilles, and it certainly was a wonderfully pretty place and full of interest. If the weather had not been so perfect for flying I should have been tempted to have stayed there another night.

No petrol was available at the landing ground, so we had to bring what we wanted in five-litre cans in our taxi, in the morning.

Over the Mountains

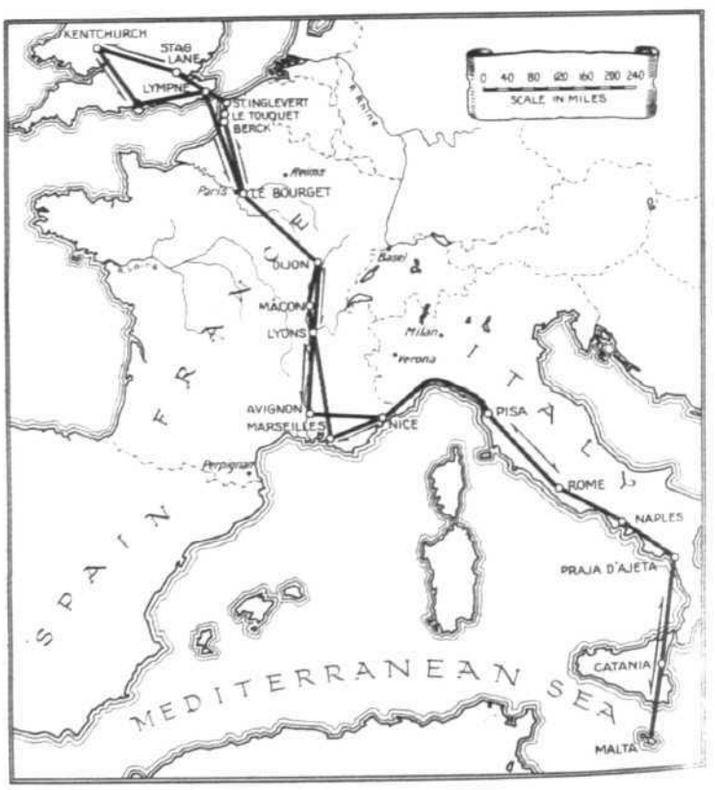
The weather next day being equally good we decided to miss out Marseilles and fly direct to St. Raphael, across the Alpes Maritimes. In places the mountains were about 4,000 ft. high, but we flew at 7,000 ft., which gave us plenty of scope to reach the valleys in the event of a forced landing. On striking St. Raphael we followed the coast to Nice where we filled up with petrol for the mountainous trip to Pisa. The scenery was glorious, but unfortunately, beautiful scenery varies inversely with good flying country, and with a few exceptions—Albenga and Spezia, where there were landing grounds and parts of the sea shore from Spezia to Pisa—the sea would have been the only place to make a forced landing. On approaching Pisa, as we came down from 7,000 ft. to 4,000 ft., the change of temperature was terrific; the damp heat as it struck one in the face gave one the impression of walking into a hot-house on a cool day.

The Italians here (as everywhere) were very attentive, dozens of airmen helping to work the petrol pump and still more to wheel the machine into the hangar. Although it is only a one-man job I counted four officers and fifteen airmen helping me to house the machine for the night. We had no difficulty about customs, thanks to the Carnet issued by the Royal Aero Club, but the customs man apologetically confiscated my brother's camera and returned it next morning with the case elaborately tied up with string and secured with lead seals; thus it would have to remain, he told us, until we left Italy. When we asked if we could ring up for a taxi they promptly produced a Service tender to take us to our hotel.

Further Italian Courtesy

The next day saw us at Naples, having stopped at Rome for petrol. At the latter place we had another illustration of Italian courtesy. After about an hour of waiting for petrol and getting our journey log stamped, unaccustomed to the intense heat we longed for some water, so my brother, delighted at finding some use for the Latin he had learnt at school, remarked to the Captain who was in charge of fuelling us, "Aqua! Aqua!" at the same time going through the motions of drinking. The Captain evidently recognised the familiar motion, gave a curt order to someone in the background, whereupon two iced bottles of beer were immediately produced. In fairness to the Captain I should like to mention that nothing would induce him to have any himself.

About 60 miles north of Naples we encountered low clouds and thick haze and the atmosphere became very bumpy. As we approached Naples Bay we realised that this must have been entirely due to the smoke from Vesuvius, which we could just discern through the gloom steadily fuming. I remembered



LIEUT. RICHARDSON'S TOUR: In his private owned "Moth" this officer, during the course of h summer leave from H.M.S. "Furious" (Fleet A Arm), made a return flight to Malta, accompanied b his brother. The mileage covered was 3,730 for hours' flying.

reading in the Paris *Daily Mail* two days before that Vesuvius had been erupting quite actively, so this must have been the after effect. Here, as well as at Rome, they ignited smoke bombs to indicate the direction of wind, which were very helpful.

The next day (August 6) we broke the journey to Catania by stopping at a small landing ground in the Gulf of Policastra at a place called Praja D'Ajeta. Here there were a few military under an N.C.O. who supplied us with petrol. From there we flew for another 2¾ hours to Catania. We decided to push on to Malta the same afternoon and took off from Catania at 4.30. Unfortunately, the only weather report we could get was a local one and I don't think it was very accurate. However, I adjusted my course over the land until I was flying exactly along the desired track and steered into the blue by compass, with the wind north-easterly about 8 m.p.h. The visibility rapidly became poor with haze and I realised that I should not sight Malta until I was within, at the most, eight miles of the island. After 45 mins. over the sea, by which time we should have seen land, we saw a steamship whose smoke definitely told us that the wind had completely changed over the sea and was now blowing from the west. This accounted for our having sighted no land so I made a bold alteration of course to the westward and we sighted Malta right ahead through the haze a few minutes later.

Back to Italy

At Calafrana I met several friends, and after a short stay in the mess, during which time the Officer Commanding R.A.F. Base kindly allowed the R.A.F. to make a top overhaul of my engine, we departed again for Italy, escorted by two R.A.F. seaplanes, who carried out a direction-finding wireless exercise with the Base. At Catania both machine and occupants took in fuel and we arrived at Praja at 6.15 p.m., after a trek against the wind of 3 hrs. 20 mins. After being thoroughly bitten by mosquitoes in the local hotel (one rendered my left eye completely unserviceable) we rose at 4 a.m. intending, if possible, to make Nice in one day. On running up the machine, however, she missed badly on one switch, and my heart fell, as I particularly did not want any delay on this day. On checking the plugs, however, we found that the rubber insulation on one of the leads had been in contact with a cylinder, the insulation burning through and causing a short circuit. This was soon remedied with insulating tape. I was relieved to find nothing worse. We were off by 6 a.m. and stopping at Naples, Rome and Pisa for petrol we arrived in Nice at 7.15 p.m., having flown for 9 hrs. 50 mins. in the day. Here we stopped to visit friends at Cannes. One morning we were going to fly but discovered there was hardly any compression on one cylinder, so I engaged the services of a very good mechanic (who belonged to M. Maicon, the owner of the aerodrome), and we discovered two broken piston rings. We were luckily able to find some in Nice, which, with a little grinding down, fitted. This was the only engine trouble of the whole trip and it could not have occurred in a more convenient place.

Difficult Flying

On August 23, after a delightful holiday, spent chiefly in bathing, we left for home via Le Touquet. We returned via Marseilles instead of crossing the mountains, bad weather being predicted to the northward. Valence saw the end of our fine weather spell, and from there the weather became gradually worse till we landed at Lyons in pouring rain and in next to no visibility. It rained all night and the next morning, but by 12.30 p.m. things began to look a bit more cheerful, and we took off for Dijon. Flying at about 800 ft. for half-an-hour, the clouds again descended on us and I resorted to the river for guidance. It became worse and worse, until at Macon I was at about 100 ft., keeping a good lookout for bridges and river traffic. Knowing there was a landing ground at Macon, we tried to find it, but the visibility being the length of one field and the lack of a large-scale plan of this particular landing ground, made this task a difficult one. After twenty minutes' "hedge-hopping," my brother saw the welcome white circle and we landed. The aerodrome was completely waterlogged, and the man in charge told us it had been raining there for 15 consecutive days. After waiting about 40 minutes the clouds had lifted enough to make it possible to proceed, and we made Dijon without further incident, where we stayed the night. The next day (August 25th) we had considerable difficulty in negotiating the Cote D'or mountains (north-west of Dijon) on account of the rain and low clouds which were capping the peaks. By following the lower lying ground, we managed to get through safely, but in doing so had to go a long way out of our course. The weather improved the other side and at Sens I was again able to set a compass course for Le Bourget. My little Hughes Midget compass was invaluable to me throughout my trip, as I invariably used it when visibility permitted, obtaining my drift as previously described in the Catania-Malta trip.

A Beach Landing

We refuelled at Le Bourget and flew on to Le Touquet, where, by landing on the beach for lunch, we caused a certain amount of unnecessary panic amongst the local gendarmerie, who eventually let us go with a warning. Other private owners would be well advised not to land on French beaches, if they can help it. We pegged out the machine at Berck, where there is no hangar accommodation, and spent a day at Le Touquet, where we dispensed with our remaining cash at the casino.

On the 26th, we pointed the machine for home, landing at St. Inglevert for customs and passport action and then at Lympne. There was a 30 m.p.h. gale in the channel and we took 35 minutes to travel the 30 miles from St. Inglevert to Lympne. An hour and a-quarter later we were at Stag Lane, where we finished our trip.

Statistics

Date.	From.	To	Dist. m.	Time. h. m.	Aver. Speed. m.p.h.	Wind.
1.8.27	Kentchurch (Via Cowes)	Lympne ..	228	3 45	*	
2.8.27	Lympne ..	Le Bourget	168	2 18	73	N.5
3.8.27	Le Bourget	Dijon ..	172	2 35	67	
,,	Dijon ..	Lyons ..	110	1 23	79	N.15
,,	Lyons ..	Avignon ..	128	1 20	96	N.20
4.8.27	Avignon ..	Nice ..	135	2 27	*	
,,	Nice ..	Pisa ..	200	2 32	79	W.S.10
5.8.27	Pisa ..	Rome ..	172	2 30	69	
,,	Rome ..	Naples ..	120	1 43	70	
6.8.27	Naples ..	Praja ..	110	1 57	*	
,,	Praja ..	Cantania ..	200	2 47	72	N.W.5.
,,	Cantania ..	Malta ..	120	2 00	*	
8.8.27	Flying	at Malta ..		35	*	
9.8.27	Malta ..	Cantania ..	120	1 50	65	N.W.5
,,	Cantania ..	Praja ..	200	3 20	60	N.W.5
10.8.27	Praja ..	Naples ..	110	2 10	51	N.W.10
,,	Naples ..	Rome ..	120	1 45	68	N.W.5-10
,,	Rome ..	Pisa ..	172	3 02	57	N.W.10
,,	Pisa ..	Nice ..	200	2 45	73	
,,	Flying	at Nice ..		2 05	*	
23.8.27	Nice ..	Marseilles	112	1 52	*	
,,	Marseilles	Lyons ..	168	2 10	78	S.5-10
24.8.27	Lyons ..	Macon ..	38	1 00	*	
,,	Macon ..	Dijon ..	74	1 18	57	N.10
25.8.27	Dijon ..	Le Bourget	172	2 35	67	W.10
,,	Le Bourget	Le Touquet	117	1 50	*	
,,	Le Touquet	Berck ..	10	15	*	
26.8.27	Berck ..	St. Inglevert ..	33	22	90	S.W.30
,,	St. Inglevert ..	Lympne ..	30	35	52	S.W.30
,,	Lympne ..	Stag Lane	78	1 15	*	
,,	Stag Lane	Kentchurch	113	2 00	56	

Total mileage: 3,730; flying time, 60 hrs 1. min.; average speed, 69 m.p.h.

* *Note.*—Most direct route not flown.

Some Observations

Aerodromes

1. *France*

French aerodromes are plentiful, and efficiently run by the "Service de la Navigation Aerienne." In addition there are a large number of organised landing grounds near the smaller towns, some possessing hangar accommodation, most of which have an office and official of the S.N. Ae. These are invariably marked with a white circle, the name being written in white letters across the diameter. If, as in some cases, petrol is not stocked, it can be obtained at short notice by telephone. A map of France, showing all the aerodromes and landing grounds, is included in the Air Pilot Monthly Supplement No. 31 of May, 1927. This map is revised from time to time. Large scale plans of aerodromes abroad also appear from time to time in this publication, and are of considerable assistance in identifying aerodromes.

2. *Italy*

In most cases the civilian and military aerodromes are in one, the civilian being on the opposite side to the military. At Rome, I landed at the wrong end, and owing to the very hard and rough surface I had to take off and land again the other side to save my under-carriage the severe strain of taxying. The organisation for dealing with civilian aircraft was considerably slower than in France. The western coastal route possesses a large number of emergency landing grounds, in most cases not far from a town, marked in white with the name, on each side of which was a "T." Although these would be of use for landing with a failing engine, in most cases they appeared to be unattended. On the main aerodromes in both France and Italy, the direction of the wind is indicated, in addition to the usual wind sleeve, by a white "T," mechanically mounted, which is kept trained with the cross of the "T" in the direction from which the wind is blowing. In many cases, especially with a light breeze, this was a better guide than the wind sleeve. Also, at Rome and Naples, smoke bombs were ignited as an additional guide when I circled the aerodrome.

Fuel

Petrol and oil—particularly the latter—are more expensive on the Continent than in England, and some of the grades of petrol supplied in Italy (although called "Aviation special") were of doubtful quality. It was also found that in several cases quite an appreciable amount of water was trapped by the chamois leather when filling. Castrol "R" was obtainable at Le Bourget Aerodrome (Imperial Airways) the Grand Garage, Nice, and at Naples (Emanuele Vaccaro, S. Lasquale, 45-47. Tel. 11905).

Customs, Log Books, etc.

The carnet issued by the Royal Aero Club went a long way towards satisfying the foreigner's craving for "papers," chiefly, I think, because it is written in French! This document is absolutely essential for touring abroad. The customs officers did not trouble us much about personal luggage, but in Italy our camera had to be sealed the whole time. Cameras may not be carried by foreign pilots over Italian territory unless so sealed, and must be produced at each aerodrome visited, a notation being made in the Journey Log Book to the effect that it has been inspected.

The Journey Log Book has also to be visaed by the aeronautical authorities on every occasion of arrival and departure at an aerodrome, and by the customs authorities when entering or leaving a country.

Maps

"Taride" maps to the scale of 1/500,000 or approximately 8 miles to the inch was quite a convenient size. Although in England, which is so congested, especially in the south, this scale is somewhat on the small side, in France distances are so much greater and the towns correspondingly spread out that no difficulty was experienced in identifying the country. The only bad point about the French maps was that mountains were denoted by hatching instead of contour shading, forests and rivers were plainly marked. Messrs. Stamford, of Charing Cross, arranged my maps in a very convenient form, folding them 10 in. by 7 in., which exactly fitted the shelf above the dashboard of the "Moth." The maps were waterproofed and had large scale plans of landing grounds (cut out of supplements to the Air Pilot) pasted on the backs.

LIGHT 'PLANE CLUBS

London Aeroplane Club, Stag Lane, Edgware. Sec., H. E. Perrin, 3, Clifford Street, London, W.1.

Bristol and Wessex Aeroplane Club, Yate, Gloucester. Secretary, Lieut.-Col. C. Fleming, Filton Aerodrome, Patchway.

Hampshire Aeroplane Club, Hamble Southampton. Sec., Maj. Ross White, Hamble, Southampton.

Lancashire Aero Club, Woodford, Lancs. Sec., C. J. Wood, Oakfield, Dukinfield, near Manchester.

Midland Aero Club, Castle Bromwich, Birmingham. Sec., Maj. Gilbert Dennison, 22, Villa Road, Handsworth, Birmingham.

Newcastle-upon-Tyne Aero Club, Cramlington, Northumberland. Sec., A. H. Bell, c/o The Club.

Norfolk and Norwich Aero Club, Mousehold, Norwich. Sec., H. O. Bennett, 5, Opie Street, Norwich.

The Scottish Aero Club Movement, 101, St. Vincent Street, Glasgow. Sec.: Harry W. Smith.

Suffolk Aeroplane Club, Ipswich.—Secretary, Courtney N. Prentice, "Hazeldell," Stowmarket, Suffolk.

Yorkshire Aeroplane Club, Sherburn-in-Elmet, Yorks. Sec., D. M. N. Coles, The Aerodrome, Sherburn-in-Elmet.

LONDON AEROPLANE CLUB

REPORT for the week ending September 18. Flying time: 39 hrs. 35 mins. Dual: 21 hrs. 10 mins. Solo: 15 hrs. 55 mins. Passenger: 2 hrs. 30 mins.

Dual Instruction: With Capt. F. G. M. Sparks.—J. H. Veasey, A. J. Richardson, R. G. Whalley, H. R. Presland, Mrs. Russell, J. Nesbitt, F. Yates-Brown, J. W. Radbone, E. K. Brodrick, W. L. M. O'Connor, R. P. Cooper, Miss Spooner, J. Bickley, G. Weston, F. C. Fisher, L. Rowson, Capt. Burt, E. A. Lingard, W. L. M. O'Connor, E. K. Blyth, Miss Fletcher, H. Solomon.

With Capt. S. L. F. St. Barbe.—J. H. Percy, L. Martin, E. N. Clarke, P. W. Hoare, P. H. R. Whitehead, F. Yates-Brown, J. W. Radbone, Miss Wilson, R. G. Whalley, R. P. S. Taylor, Capt. Burt, G. Black, Mrs. Russell, G. E. Clair, P. W. Hoare, F. C. Fisher, L. Rowson, M. Parkin.

Solo Flying: J. J. Hofer, N. H. Jones, G. C. Bonner, W. Hay, P. W. Hoare, J. H. Veasey, Miss O'Brien, B. B. Tucker, W. Roche-Kelly, R. P. Cooper, C. E. Murrell, A. F. Wallace, J. H. Saffery, K. V. Wright, Major Beaumont, A. G. D. Alderson, D. P. H. Esler, E. K. Blyth, L. C. Davey.

Passenger Flights: With Capt. F. G. M. Sparks.—Mrs. Cartenay. With Capt. S. L. F. St. Barbe.—Mrs. Hofer. With R. Malcolm.—C. D. Elliott. With O. J. Tapper.—J. J. Hofer. With W. Hay.—A. Fowler.

BRISTOL & WESSEX AEROPLANE CLUB

FLYING report for week ending September 17.—Flying time, 16 hrs. 45 mins Instruction, 13 hrs. 20 mins. Soloists, 2 hrs. 10 mins. Passengers, 1 hr 15 mins.

Instruction (with Mr. Bartlett): Miss Miles, Miss H. Pitman, Messrs. D. H. Amory, Hon. H. C. H. Bathurst, A. H. Downes-Shaw, R. S. Clan, A. E. G. Hawkins, R. A. Hall, R. H. C. Peters, J. E. Tratman, N. H. Warren, G. L. R. Welch, J. H. Roberts.

Soloists (under instruction): A. H. Downes-Shaw, R. A. Hall, J. E. Tratman.

Passengers (with Capt. Barnwell): Master R. A. Barnwell and Master Barnwell.

Pilots: Capt. Barnwell.

Last week saw our first soloist launched under instruction. This week we have three, our chairman, Mr. A. H. Downes-Shaw and Mr. Tratman having carried out their first solo flights.

On Monday Miss Miles, piloted by Mr. Bartlett, visited the Patron of our club His Grace the Duke of Beaufort and landed in the grounds at Badminton.

The Rt. Hon. Sir Samuel Hoare, Bart., C.M.G., M.P., has kindly consented to come down on Saturday, October 8, and officially open the club. As stated last week, we hope that all those interested in aviation will visit us on this occasion.

HAMPSHIRE AEROPLANE CLUB

REPORT for week ending September 18.—Flying time, 20 hrs. 40 mins. Instruction, 13 hrs. 25 mins. Soloists, 4 hrs. 50 mins. Joy riders, 50 mins. Test flights, 1 hr. 35 mins.

Instruction (with Flight-Lieut. Thomson): Mrs. Aitken Dick, 1 hr. 25 mins. Sir F. Carmichael Anstruther, Bart., 30 mins.; Hon. H. R. Grosvenor, 25 mins. Lieut.-Comdr. Woodhouse, R.N., 15 mins.; Lieut. Hall Thomson, R.N., 45 mins.; Lieut. Lambe, R.N., 20 mins.; Lieut. Mandeville, R.N., 50 mins.; Messrs. Duggan, 2 hrs. 10 mins.; A. R. Mellor, 15 mins.; Whittle, 10 mins.; Molony, 10 mins.; Baynes, 10 mins.; Standford, 1 hr. 25 mins.; Dickson, 45 mins.; Crook, 50 mins.; Blake, 25 mins.; Hancock, 1 hr. 15 mins.; Puttock, 30 mins.; Boileau, 25 mins.; and Capt. Molyneux, M.C., 25 mins.

Soloists: Don J. de la Cierva, 10 mins.; Hon. H. R. Grosvenor, 15 mins.; F. O. Southey, 55 mins.; Messrs. Mellor, 40 mins.; Bowen, 45 mins.; Sanders Clark, 25 mins.; Wells, 15 mins.; Nicholson, 10 mins.; Fagan, 35 mins.; Rumble, 10 mins.; E. A. L. Parker, 15 mins.; Lieut. Graham, R.N., 10 mins., and Stanford, 5 mins.

Passengers (with Flight-Lieut. Thomson): Mr. Aitken Dick, Master Waite, and Mr. Thring. (With K. P. L. Bowen): Mr. Brady, Mr. Boxhall. (With F. O. Southey): Mrs. Graham and Mrs. Crook.

On Sunday, Mr. Stanford (assistant to Mr. Cracken, our ground engineer) made an excellent first solo flight after six hours' dual.

Mrs. Elliott Lynn dropped in on her Avian on Sunday afternoon.

LANCASHIRE AERO CLUB

REPORT for week ending September 17.—Flying time, 13 hrs. 5 mins. Instruction, 3 hrs. 55 mins. Solo flights, 3 hrs. 55 mins. Passenger flights, 4 hrs. 50 mins. Test, 25 mins.

Instruction (with Mr. Brown): Messrs. Riley Wilson, Brooking, Browning, Ruddy, Stonex, Tweedale, Sykes and Allott.

Soloists (under instruction): Messrs. Rowley, Anderson, Meads, Shiers and Miss Baerlein.

Pilots: Messrs. Fallon and Harber.

Passengers (with Messrs. Brown, Cantrill, Scholes, Goodfellow, Williams, Costa and Michelson): The Misses Smith, Morgan, Elston, Plant and Parrott; Messrs. Tattersall, Mills, Gort, G. Guest, John Guest, James Guest, Rodman, Spruce, Preston, Dawson, F. Scholes, Moore and Ewan.

LV had an adventurous time on Saturday afternoon. She started by standing on her nose in the middle of the 'drome, smashing the prop and bending the cowling, but was flying again an hour later. Determined to avoid the middle of the 'drome this time she came down heavily on a bad ridge close to the boundary. Two years ago she would probably have leaped skittishly 40 ft. into the air and thought nothing of it, but now, alas, her knees gave under her and with a sad sweet smile she buried her nose firmly in the mud to the accompaniment of gentle cracking and scrunching sounds from her longerons and spars. It was only last week that one spent from 9 p.m. to 1.20 a.m. trying to convince Capt. Lamplugh how really well behaved all our machines were. It's very 'ard. "*Ne mulieri credite.*"

Hooton Park, September 24.—It looks as if at least 50 kites are going to be present. Fortunately, there is plenty of space and accommodation. The R.A.F. is putting up an hour's programme with Gamecocks, Horsleys, Bristols Snipes, Avros and twin-engined night bombers. Owing to the number of entries for some of the events it will be necessary to fly off heats during the morning.

A dinner-dance will be held at the Midland Adelphi, Liverpool, on Friday evening. Tickets (12*s.* 6*d.* each) may be had in advance by writing, with a cheque, to Mr. M. Anderson, 3, Lord St., Liverpool. Those intending to stay at the Adelphi are advised to book their rooms in advance.

MIDLAND AERO CLUB LIMITED

Report for week ending September 17.—Total flying time, 11 hrs. 35 mins.

Dual instruction (with Mr. McDonough).—O. L. Richards, R. Cazalet, C. H. Dawson, J. E. Brewin, C. Fellowes, E. P. Lane, Lattey.

Passengers with Mr. Willis and Mr. *Brighton* :—Messrs. *Goodwin*, Barker, Baldwin, Gundle, Darlington, Moore.

Two days only were fit for flying, otherwise high winds and heavy rain.

Mr. R. L. Brinton completed a satisfactory first solo flight.

NEWCASTLE-UPON-TYNE AERO CLUB

REPORT for week ending September 18.—Flying time : 28 hrs. 25 mins. instruction, 11 hrs. 5 mins. ; soloists, 5 hrs. 55 mins. ; "A" pilots, 9 hrs. 50 mins. ; passengers, 45 mins. ; tests., 50 mins.

Instruction (with Mr. Parkinson) :—Sir Joseph Reed, Dr. Alderson, Messrs. Glenny, Hayton, Griffiths, Brown, Horn, Robertson, Dickinson, DePledge, R. N. Thompson and A. Bell.

Soloists (under instruction) :—Messrs. L. Middleton, J. Middleton, McDougall, Sadler, Robertson, Wardill.

"A" Pilots :—Miss Leathart, Messrs. R. N. Thompson, C. Thompson, Turnbull, Wilson, Mathews, Mathews.

Passengers :—(With Mr. Baxter Ellis), Mr. G. Ellis. (With Mr. H. Ellis), Mr. L. F. Young. (With Mr. Parkinson), Mr. Pritchet.

Mr. A. J. Rasmussen carried out the tests for his licence in excellent style, on Monday.

Mr. A. H. Sadler, who is 16 years old, carried out his first solo flight on Wednesday, putting up a very good performance.

Mr. J. P. DePledge was launched on Friday finishing up a very steady flight with an excellent landing.

The Flying Meeting arranged for the 24th has been cancelled, and although the club cannot support the Lancashire Club with machines, it has not proved a hindrance in any way.

L.N. was damaged when it came into contact with a hedge on Saturday evening, exactly seven days after coming back to service after repairs and overhaul for C. of A.

The Aerodrome will be closed down for Staff Holidays from October 3 to 17 inclusive. The Clubhouse will be closed during this period also.

SUFFOLK AEROPLANE CLUB

REPORT for week ending September 18.—Flying time, 7 hrs. 15 mins.

Instruction with Mr. Carnegie : —Miss Dorothy Creasy, G. Hutley, Dr. Jas. Sleigh, N. Creasy, H. Billinton.

Passenger :—Miss Carol Rygate.

Solo :—Courtney Prentice.

This has been an unfortunate week. Monday, Tuesday and Wednesday, torrential rains practically flooded the aerodrome. At last the weather cleared and members arrived in full force but after only a few hours' flying there were murmurs and gnashing of teeth as the *Bluebird* returned to her hangar minus tail skid and king post. This finished flying for the week-end.

YORKSHIRE AEROPLANE CLUB

REPORT for week ending September 17 :—*Flying time* : total, 18 hrs. 45 mins. instruction, 6 hrs. 25 mins. ; soloists, 8 hrs. 45 mins. ; passengers, 3 hrs. 35 mins.

Instruction (with Captain Beck) :—"Dual" Messrs. Crowther, Humphries, Hirst, Yeomans, Swift, Tattersal, Priestley, Ambler, Dujardin, Mason, Batcock, Miss Watson. "Solo" : Mr. R. K. Lax.

"A" Pilots :—Miss Woodhead, Captain Milburn, Messrs. Thompson, Brackenbury, Fielden, Wilson, Norway, Atcherley.

Passengers with Captain Beck :—Miss Crawford, Miss M. Crawford, Messrs. Nash and Stevenson.

On Monday, Mrs. Eliot Lynn landed with her "Avian" on her way from Glasgow to Stag Lane, and owing to the "dud" weather which made flying impossible, we managed to persuade her to stay till Wednesday. This week has seen the arrival of our second Bluebird, at a most opportune moment, because we have had to lay up our Moth for top overhaul. The Pageant arrangements are in full swing, and we hope to see a big crowd at Sherburn on October 1 and 2.

SCOTTISH AERO CLUB

THE enthusiasts of the Scottish Flying Club formed a Committee last April to investigate the systems adopted by existing clubs and to survey the local district for a suitable aerodrome. This preliminary work the members have done fully, and have now issued a special memorandum setting forth the results and suggested conditions pertaining to the proposed Club. After their survey of the Glasgow area both by ground and air they could only recommend two sites, both of which would require a preparation lasting twelve to eighteen months. The Air Ministry was therefore approached about the difficulty, and they have granted them the use of Moorpark Aerodrome, Renfrew, if the Club was formed in the near future. The whole propaganda has drawn 480 enquiries from enthusiasts, and for this satisfactory response thanks are also due to the managements of the Glasgow Theatres and Cinemas, Club Executives, and the principals of numbers of business houses, besides others. The Committee suggests three grades of membership :—Pilot, Observer and Associate, paying annual subscriptions of £4, £2 and £1 respectively. For the first two grades the entrance fee will be £1 and for the Associate members 10*s*. The first fifty pilot members will be Founder Members and shall not be liable to pay an entrance fee. Membership is open to British subjects only. The agreement granted by the Air Ministry limits the number of machines that a club may operate at Renfrew, therefore it may be necessary to limit the number of Pilot members.

The suggested flying charges are as follows :—Dual control instruction, 40*s*. per hour ; solo flying, 30*s*. per hour ; qualified flying member with observer member, 35*s*. per hour ; qualified flying member with associate or guest, 40*s*. per hour. The duration of flights will extend from 15 mins. upwards, and the charges will be *pro rata*. This scale will be subject to revision if the Club secures a subsidy under the new scheme. Such items as secretarial, insurance, administration, and the usual overhead expenses are all covered, but the provision of equipment depends upon the generosity of the public, and an appeal is therefore, made to Scotland, in the interests of what is hoped will be Scotland's National Aero Club. In this connection they are pleased to announce that the cost of the first machine is provisionally guaranteed.

Air Commodore J. G. Weir, C.M.G., C.B.E., is Trustee of their Founding and Establishment Fund.

Lieut. Bentley's Progress

THIS South African Air Force pilot reached Khartoum from Cairo on September 14 in his "Moth." The next day, on the stage between Khartoum and Mongalla, he made a forced landing at Kosti, about 200 miles from the former place. Ascending again on September 17, he arrived at Malakal in the evening, Mongalla on September 18, and Kisumu on September 19.

Private Owners for Venice

MRS. CARBERY, who has just taken her ticket at Stag Lane, is flying to Venice in her own "Moth," accompanied by Capt. H. S. Broad. Miss Spooner, of the London Aeroplane Club, is also going in her own "Moth," in which an extra petrol tank has been fitted. She will fly alone. Capt. L. Isett and Mr. T. D. Mill are flying together in a "Moth," and Mr. A. S. Butler is taking a passenger, Mr. P. Hoare.

Aerodrome Developments in U.S.A.

BY the end of this year more than 1,000 airports and intermediate fields will be in use across the United States from coast to coast, and from the Gulf of Mexico to Canada, according to the Aeronautics Branch of the American Department of Commerce. A survey just completed shows that 865 permanent stations are now in use, with 187 cities definitely considering the establishment of municipal airports. Of the present stations, 207 are municipally owned. Chambers of Commerce, business clubs, and other civic organisations are co-operating in the effort to build up a complete airway and airport system. Many authorities are urging permanent construction for airport buildings, and especially for fields and runways. 'Planes for projected passenger lines, carrying as many as thirty passengers, such as the Ford line between Chicago and Los Angeles, and seven or eight ton freight 'planes, will require rigid landing surfaces. Turf and cinders, it is claimed, will not stand the wear. It is recommended that runways of concrete 100 ft. wide should be laid, or even that the entire aerodromes should be of concrete, particularly since this permits landing and taking-off regardless of weather.

Mrs. Eliott-Lynn's Tour Completed

AT Perth the engine of Mrs. Eliott-Lynn's "Avian" had to have a top overhaul. The Air League, for whom she was making this Scottish tour, secured an Avro 504K from the Berkshire Aviation Tours, Ltd., with Mr. Rimmer as pilot. This machine picked her up at Perth and went on to Glamis Castle, and then Aberdeen, where the Lord and Lady Provost and members of the Town Council met them. After a municipal lunch, they went to the flying field (a cricket field adjoining the esplanade), where 10,000 people had gathered. Forty people joined the Air League, and had the free flight that went with the membership. Passengers were taken up at Renfrew, and Mrs. Eliott-Lynn gave a lecture on aviation and the need for municipal aerodromes. Eventually, her own machine was ready and she flew it from Perth, landing at Gleneagles Hotel, and giving demonstrations. At Glasgow, the Lord Provost entertained her at a municipal lunch. After this, the return flight south was made, and the tour finished.

Offer for Club Members

MRS. ELIOTT-LYNN states in a letter that a number of members of flying clubs are desirous of taking their "B" Licenses. She gathers that her "Avian" is the only light aeroplane in the country permanently equipped for night flying, with navigation lights, instrument lights and Holt flares. She would be pleased to loan her machine, without charge, to any club having such members and wanting to do night flying if the club will bear all costs, such as insurance.

AIRISMS FROM THE FOUR WINDS

"Balloon Jumping" in Germany: During the meeting at Berlin recently the new sport was demonstrated. The meeting was a great success, and was witnessed by more than 100,000 people.

Lord Stonehaven's Australian Air Tour

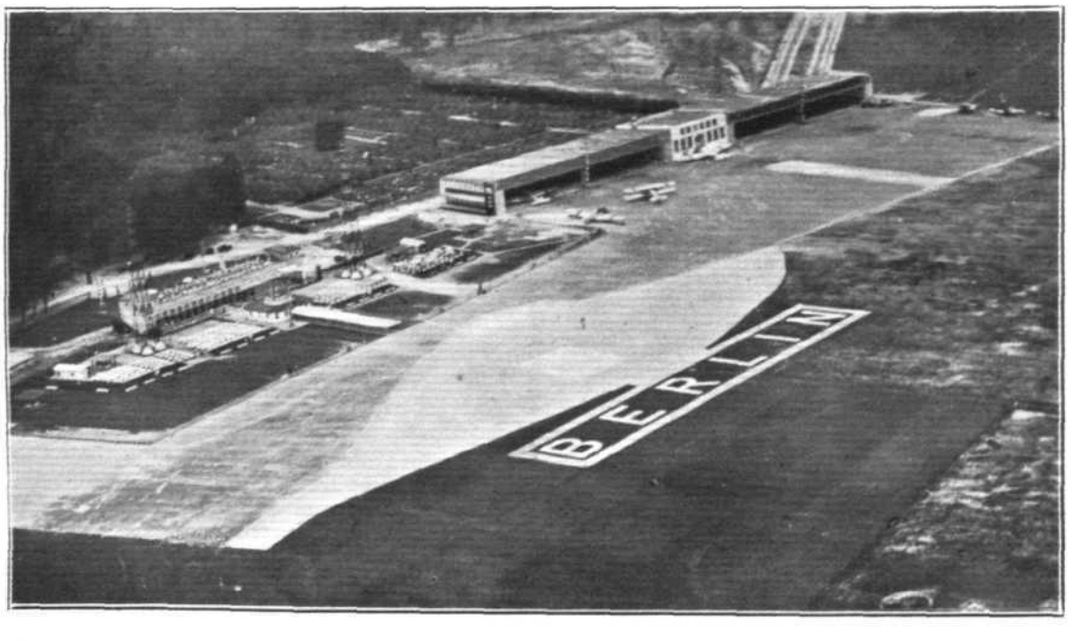
THE Governor-General, Lord Stonehaven, reached Adelaide by air on September 16 in the course of a ten days' official visit to South Australia. In the few days preceding he had spent about twenty hours' flying, travelling from the Gulf of Carpentaria and visiting sheep stations in the back country. Lady Stonehaven was due to join him early this week.

American Long-Distance Races Commence

FOR one event in the Spokane Air Derby 25 machines left Roosevelt Field, Long Island, on September 19 for Spokane, a distance of 2,273 miles. The conditions of the race demand a wait of five minutes' duration at eight different towns on the course, and all-night stops at two other places. Five machines came down with engine trouble and other difficulties before the first stage was reached. One competitor withdrew owing to fog over the Pennsylvania mountains, which he regarded as too dangerous to attempt.

America Air Fatality

A FOKKER monoplane with 12 people on board crashed in an orchard near New Brunswick, New Jersey, U.S.A., on September 17. Seven were killed, including the pilot and mechanic, and five were seriously injured, their lives being despaired of. The Reynolds Aircraft Corporation had been holding joy-riding flights, and the number of passengers wanting to take advantage of these had compelled the use of the big Fokker and the loan of the services of Mr. H. T. Chandler, a skilful air mail pilot. He made five uneventful



The Air Port of Berlin: Aerial photograph *of* the Tempelhofer Feld. Note hangars, wireless masts, and restaurants.

trips in the machine before the fatal crash. The company had carried 4,000 passengers an aggregate of 350,000 miles since July 15 and had never previously had an accident. Their machines were always inspected each day before flying commenced.

World Flight Ended

THE entreaties of their relatives and friends, coupled with the hitch in fuel preparations on the Midway Islands, in the Pacific, have brought the round-the-world flight of the two American airmen, Mr. Schlee and his pilot, Mr. Brock, to an abrupt end, much to their personal regret. They were on the verge of attempting three long sea flights, the most dangerous stages of the tour, and naturally these had given their friends in America cause for alarm in face of the recent ocean disasters. The ambitious flight commenced on August 27 from Harbour Grace, Newfoundland, and finished at Tokio on September 14. Over 12,000 miles had been flown between those points. Both airmen were due to sail for America on September 17. The following is a log of the flight, the mileage being approximate :—

Aug. 27—Harbour Grace, Newfoundland.
,, 28—Croydon (2,350 miles).
,, 29—Croydon–Munich (600 miles).
,, 30—Munich–Belgrade (610 miles).
,, 31—Belgrade–Constantinople (500 miles).
Sept. 2—Constantinople–Baghdad (1,200 miles).
,, 3—Baghdad–Bander Abbas (885 miles).
,, 4—Bander Abbas–Karachi (710 miles).
,, 5—Karachi–Allahabad (925 miles).
,, 6—Allahabad–Calcutta (485 miles).
,, 7—Calcutta–Rangoon (665 miles).
,, 8—Rangoon–Hanoi (800 miles).
,, 9—Hanoi–Hong-Kong (600 miles).
,, 10—Hong-Kong–Shanghai (770 miles).
,, 11—Shanghai–Omura (500 miles).
,, 14—Omura–Tokio (600 miles).

French Tour of Mediterranean

CAPT. PELLETIER D'OISY, Lieut. Gonin, and M. Vigouroux have completed an air tour of the Mediterranean, starting and finishing at Le Bourget. The course followed touched at Vienna, Bucharest, Beirut, Cairo, Bengazi, Tunis, and Casablanca. They reached Le Bourget from Casablanca in 12 hrs. 55 mins. on September 19. They used a S.E.C.M. Lorraine 600 CV machine.

Metal Construction at Vickers

IN connection with our article on this subject in last week's issue of FLIGHT, it should have been pointed out that Vickers Limited hold a patent covering the fabrication of wing spars by the assembly of the "wandering web," or as it is officially termed, the "ripple web," and suitable flange members. It will be recollected that the same type of web is used with flanges of channel, double T and L sections.

At the Berlin Meeting : Two German pilots with their glider, which was towed behind an aeroplane. They are Herren Raab and Katzenstein, and form the company which is now building de Havilland "Moths" in Germany under licence.

THE ROYAL AIR FORCE

London Gazette, September 13, 1927.

General Duties Branch

The following Pilot Officers are promoted to rank of Flying Officer :—J. D'A. Keary, E. M. Thompson (April 12) ; A. W. B. Hale (June 16) ; P. A. Moritz, H. T. A. Silcox (July 6) ; F. H. Bailey (July 7) ; J. B. M. Wallis, R. O. O. Taylor (July 12) ; C. S. John, D. Mackenzie (July 16).

The following Flight-Lieuts. are transferred to Reserve, Class A (Sept. 13) : W. B. E. Powell, C. D. Spiers. Wing-Commdr. W. R. Read, M.C., D.F.C., A.F.C., is placed on half-pay list, Scale B, from Sept. 19 to Nov. 30 inclusive ; Flight-Lieut. G. D. Daly, D.F.C., ceases to be seconded for duty under Colonial Office (Sept. 12) ; Flying Officer H. E. N. Burton resigns his short service commn. (Sept. 14).

Flying Officer C. B. McIntyre is cashiered by sentence of General Court-martial (Aug. 30).

Medical Branch

J. M. Ritchie, M.B., is granted a short service commn. in rank of Flying Officer for three years on active list, with effect from and with seny. of Sept. 1 ; Flying Officer A. F. Cook is promoted to rank of Flight Lieut. (Sept. 16) ; Flying Officer M. D. Rawkins, M.B., B.S., is transferred to Reserve, Class D (ii) (Sept. 17).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The following are granted commns. in Class AA, as Pilot Officers on probation : H. J. Penrose (Aug. 29) ; L. Currie (Aug. 31). The following Pilot Officers on probation are confirmed in rank (Sept. 13) :—A. L. Muir, E. K. Rayson. The following Flying Officers are transferred from Class A to Class C :—J. Spooner (Aug. 28) ; W. P. Wiltshire (Sept. 4) ; A. D. Page, M.M. (Sept. 11). Flight-Lieut. J. H. Jennings relinquishes his commn. on completion of service (Sept. 12).

AUXILIARY AIR FORCE

General Duties Branch

The following Pilot Officer to be Flying Officer :—No. 605 County of Warwick (Bombing) Squadron.—C. R. Field (Aug. 31).

Princess Mary's R.A.F. Nursing Service

The following Staff Nurses are promoted to rank of Sister :—Miss I. D. Mardon (Aug. 1) ; Miss E. W. Griffiths (Sept. 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Wing Commander R. M. Field to R.A.F. Depot, Uxbridge, Supernumerary on ceasing to be seconded to the Finnish Government ; 11.9.27.

Squadron Leader D. G. Donald, D.F.C., A.F.C. to R.A.F. Base, Calshot ; 12.9.27.

Flight Lieutenants H. S. Scroggs, to No. 100 Sqdn., Spittlegate ; 1.9.27. A. L. Fiddament, to Air Ministry, Directorate of Operations and Intelligence ; 15.9.27. F. L. B. Hebbert, to R.A.F. Depot, Uxbridge ; 15.9.27. F. E. C. Benstead, to R.A.F. Depot, Uxbridge ; 19.8.27. R. C. Savery, D.F.C., to Central Flying Sch., Wittering ; 14.9.27. P. L. Plant, to School of Army Co-operation, Old Sarum ; 11.9.27. C. F. Chinery, to R.A.F. Depot, Egypt ; 7.8.27. G. M. F. O'Brien, D.S.C., to R.A.F. Depot, Middle East ; 1.9.27. W. M. Plenderleith, to No. 56 Sqdn., Biggin Hill ; 1.10.27. F. F. Garraway, to No. 3 Wing H.Q., India ; 10.8.27. J. S. Nichol, to Station H.Q., Spittlegate ; 3.9.27. T. H. French, D.F.C., to R.A.F. Station, Duxford ; 6.9.27.

Pilot Officers : C. H. Appleton, B. E. Brown, M. C. Collins, T. A. D. Hetherington, H. G. Hicks, L. W. Howard, C. R. M. Kiernander, P. F. Luxton, J. E. Markby, K. C. T. Marshall, W. D. J. Michie, C. L. Myers, C. A. Pearson, H. L. Piper, J. C. K. Rogers, J. W. Smith, P. H. Smith, R. W. K. Stevens, J. C. B. Tinling, A. le R. S. Upton, and J. B. Veal ; the above Pilot Officers are posted to R.A.F. Depot, Uxbridge, on appointment to Short Service Commissions as Pilot Officers on probation with effect from 2.9.27. C. S. Cadel, S. R. Sherman, G. Bartholomew, and G. R. Weighill, to No. 4 Sqdn., S. Farnborough ; 22.8.27. F. G. Fairhead, D. S. King, and V. D. Morshead, to No. 13 Sqdn., Andover ; 22.8.27. J. H. Edwardes-Jones, to No. 1 Sqdn., Tangmere ; 22.8.27. H. C. D. Hayter, to No. 43 Sqdn., Tangmere ; 22.8.27. E. L. J. Rowe, to No. 16 Sqdn., Old Sarum ; 22.8.27. R. G. Hennessy, D.S.O., M.C., to No. 216 Sqdn., Middle East ; 26.8.27. M. M. Restell-Little, to No. 45 Sqdn., Middle East ; 25.8.27. The undermentioned Pilot Officers are posted to R.A.F. Depot, Uxbridge, on appointment to Short Service Commissions as Pilot Officers on probation, with effect from the dates indicated :—A. D. Bennett, 7.9.27 ; L. V. Bennett and Frank Wells, 8.9.27 ; J. A. Greenshields and D. M. Harrison, 9.9.27.

AIR POST STAMPS

By DOUGLAS B. ARMSTRONG

(*Editor of "The Stamp Collector"*)

Trans-Atlantic Flight Souvenirs

THIS year's Trans-Atlantic flights have not failed to provide some notable additions to the air post collection. So far as is known, Lindbergh carried no mail upon his epic flight from New York to Paris, but a commemorative air mail stamp has been issued by the United States Post Office in honour of his achievement.

On the other hand, Chamberlin is known to have been entrusted with the conveyance of a private air mail on behalf of an enterprising American air post dealer, who is already asking £2 10*s*. per cover for them.

Pinedo Flight Stamp

THE Hawker and Alcock trans-Atlantic air mail stamps of Newfoundland will have a serious rival, as regards scarcity, in a third particular issue made by the postal authorities of Britain's oldest colony in connection with the Marchese de Pinedo's ill-starred flight from Newfoundland to the Azores. He is reported to have carried 225 letters, of which about 200 were franked with the special adhesive stamp consisting of the obsolete 60 cents (Cabot issue) with Holbein's portrait of King Henry VII overprinted in red, "Air Mail de Pinedo, 1927." These letters were postmarked at Trepassy, Newfoundland, on May 23, and presumably reached Lisbon with the intrepid airman on June 11.

Lindbergh Commemoration Stamp

IN response to the public demand for a stamp commemorative of Col. Lindbergh's epic flight from New York to Paris the United States Post Office Department has changed the design of the permanent 10 cents air mail stamp to show a vignette of the aeroplane "Spirit of St. Louis" inset upon a map of the route of the flight with the positions of the terminal points indicated. The new stamp, which will eventually replace that now current was first put on sale to the public at St. Louis upon the actual day of Lindbergh's homecoming, although a proof impression was presented to the distinguished aviator by the Postmaster-General when he was received at Washington on June 12. This was quick work by the Bureau of Engraving and Printing, as the issue was only decided upon a fortnight previously. The stamp is blue in colour, and inscribed above the picture, "Lindbergh Air Mail."

Irregular Chamberlin Air Mail

MEANWHILE it is reported that the United States Postmaster-General is holding an inquiry into the circumstances under which a mail of approximately 50 letters was carried by an unauthorised person as a passenger in the aeroplane "Bellanca" on the recent New York-Berlin flight. Fabulous prices are now being demanded for these covers, which were personally conveyed by Mr. Charles Levine, Managing Director of the Columbia Aircraft Corporation. It is further alleged that the Postmaster of Hempstead, Long Island, postmarked out of course a package of 50 letters all addressed to Mr. Levine in Berlin.

Balloon Post at Strasburg, 1927

A PICTURESQUE revival recalling the sieges of Paris and Metz in the Franco-German War took place at Strasburg on June 12 in connection with the international philatelic exhibition held there in honour of the fiftieth anniversary of the Union Philatelic Society of that city. On the last day of the festivities a special mail was despatched by balloon post, in the form of covers in facsimile of the old *Ballon Monte* news-sheets issued during the Paris siege, and duly inscribed on the outside "Par Ballon Monte." In addition to ordinary postage they bore a special 1 franc Exhibition stamp.

The Strasburg Stamp Exhibition, by the way, was also notable for the fact that the first gold medal award ever made for an air post collection was bestowed upon M. von Arx, of Locarno, for his remarkable study of the air posts during the Siege of Przemysl 1914-18, whilst a similar award was made to Mr. George Bigsby, of Dulwich, for his historical collection of balloon post letters and journals from the Siege of Paris. Other awards in this class comprised silver-gilt medals to Mr. R. E. R. Dalwick's unique exhibit of the Swiss semi-official air post vignettes, and M. Francis Lamy's Paris balloon post covers; a silver medal to Commandant Aviateur Leon Hebrard (Paris) for a selection of scarce air post covers from all parts of the world and a bronze medal to M. Francis P. Renaut, who exhibited a general collection of aerogrammes representing the principal air post routes in operation to-day. From this it will be apparent that air post collecting was well to the fore and for the first time received adequate recognition at the hands of the jury.

CORRESPONDENCE

BASIC PRINCIPLES OF AIR WARFARE

[2159] May I draw attention to a misleading misprint in my review of "Basic Principles of Air Warfare" in your issue of September 15, p. 656? In the third paragraph, second line, a quotation is made to read:—(the author) "does not accept the belief that the forces of the air will support those of the sea and the land." The word "support" is a misprint for "supplant." This word gives the key to the whole attitude of the author, and it is therefore important that attention should be drawn to this correction.

I am, etc.,

September 17, 1927. F. A. DE V. ROBERTSON.

IMPORTS AND EXPORTS, 1926-1927

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1926 being given in FLIGHT, January 20, 1927.

	Imports.		Exports.		Re-Exports.	
	1926.	1927.	1926.	1927.	1926.	1927.
	£	£	£	£	£	£
Jan. ..	494	1,850	130,049	49,021	—	—
Feb. ..	2,089	679	40,416	63,080	6,341	—
Mar. ..	1,001	7,087	92,840	106,478	9,758	2,270
Apr. ..	536	822	160,832	71,190	5,051	785
May ..	342	1,258	118,539	82,708	—	640
June ..	24,866	1,249	66,111	149,907	150	162
July ..	16,033	1,798	39,047	104,167	—	750
Aug. ..	21,401	2,453	146,129	78,742	1,035	—
	66,762	17,196	793,963	705,293	22,335	4,607

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1087 (*Ae.* 266).—Wind Tunnel Tests on Aerofoil R.A.F. 34 at Negative Incidences. By A. S. Hartshorn. February, 1927. Price 4d. net. *No.* 1090 (*Ae.* 269).—Further Wind Tunnel Tests of a Slot and Aileron Control on a Wing of R.A.F. 31 Section. February, 1927. Price 9*d*. net. H.M. Stationery Office, Kingsway, London, W.C.2.

The Air Pilot Monthly Supplement. No. 35. *September*, 1927. Air Ministry, Kingsway, London, W.C.2.

British Standard Engineering Drawing Office Practice. No. 308. September, 1927. British Engineering Standards Association, 28, Victoria Street, London, S.W.1. Price 2*s*. 2*d*., post free.

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1926

Published September 22, 1927

14,957. LAWRENCE SPERRY AIRCRAFT CO., INC. Devices for launching and landing airplanes from and upon suspended positions. (253,556.)

26,102. K. CERNY. Flying machine with flapping wings. (270,240.)

APPLIED FOR IN 1927

Published September 22, 1927

5,546. J. TACKMAN. Rotary engines. (267,490.)

13,924. D. K. JETTE. Aeroplanes. (276,691.)